00088340

NOT TO BE ISSUED
OUT OF THE LIBRARY.

THE
ASIATIC SOCIETY OF BOMBAY
Town Hall, Bombay.

Digitized with financial assistance from the
Government of Maharashtra
on 09 March, 2016

Travels in Siberia

Erman Adolph

Vol - 1

London

Longman

1848

915.7
Erm/Tra
88340

PREFACE.

In 1844, one of the Royal Geographical Society's medals was conferred on M. Adolph Erman ; and in pronouncing that adjudication, the President of the Society, Sir Roderick Impey Murchison, used the following words : —

" I have already said more than enough to convince any one who has not studied the works of M. Erman, that the council has most wisely selected him to be the receiver of our patron's medal ; and there can, indeed, exist no doubt that, with the exception of the great Humboldt himself, it would be difficult, if not impossible, to find a single man in the broad field of explorers, not already honoured with our medal, who is more richly deserving of it."

It is no mean compliment to be even compared with Humboldt ; but in truth our author's narrative acquires new interest and value when placed by the side of that of his distinguished fellow-countryman, inasmuch as it presents to view a counterpart and indispensable supplement to the account of the equinoctial regions of America, in a philosophical survey of the coldest quarter of the earth, and of a portion of the Old World too, whence many a European nation may trace its origin. Nor do the inclement skies deprive his pictures of their charm. The author's intelligent sympathy with the natives enabled him in every instance fairly to appreciate their lot ; to exhibit, in bright and lively colours, the life of the roaming Samoyede under the polar circle ; and the opulence and comfort of the Yakuts in a climate which, at first

view, seems hardly compatible with human existence. Then, again, what a curious and minute sketch does he offer of the Chinese in Maimachen, and of the anniversary banquet given by their chief to the Russian merchants.

Much and various information will be found, also, in the following pages respecting the trade carried on from the frontiers of Siberia to Bokhara and Tashkend; the fisheries of the Obi; the mineral riches of the Ural and Nerchinsk; the fossil ivory in the valley of the Lena and New Siberia; and, in general, respecting the face of nature and the distribution of vegetable life throughout the northern half of the Old World.

Of the important scientific matters here brought to light, it will be sufficient to point out the existence of a Siberian magnetic pole; the perpetual congelation of the ground to a great depth at Yakutsk; and the decrease of the atmospheric pressure, as indicated by the barometer, towards Okhotsk.

This work is entitled, in the original, "Travels round the Earth," yet the portion of it hitherto published does not extend beyond Siberia, and it may be justly assumed that the author would not have left his narrative so long unfinished, if he were not sensible that what he had presented to the public was complete in itself, and lost none of its value by the suspension of his labours.

In the earlier portion of this work — the journey across Europe from Berlin to Tobolsk — we have ventured to abridge the original, and have thus been enabled to give, within the limits of two volumes of moderate size, and without curtailment, the more novel and interesting part of our author's narrative.

CONTENTS

OF

THE FIRST VOLUME.

CHAPTER I.

First Thoughts of the Journey. Monument at Pyritz. Manners fashioned by Material Nature. Dantzig. Ferry over the Vistula. Königsberg. Arrival of Swallows. The Nährung. Mirage. Memel. The Samaïtes. Russian Frontier. Mitau. Riga. Burláks, or Wandering Labourers. The Lithuanians. Valk. The Esthonians. Backward Vegetation. Dorpat. The Observatory. Boulders. Court of Justice. Ancient Greek Custom. Lake Peipus. Chudleigh. Narva. Opolye. Page 1

CHAPTER II.

St. Petersburg. The Admiralty. Neva. The Gostinnoi Dvor. The Islands. Church of Peter and Paul. Character of the Russians in the Capital. The Official Class. Hereditary Rank. Nationality. Foreign Merchants. Russian Mercantile Class Adherence to Old Usage. Match-makers. Bride Shows. The Russian American Trading Company. Artificers. Cheapness of Living. The Clergy. Museum of the Academy. Carvings by Peter I. Mammoth's Remains. Meteoric Stones. Vegetation near St. Petersburg. Scenery on the Neva. Rural Taste of the People - - - - - - - 34

CHAPTER III.

Preparations for Departure. Mode of Yoking in Carriages. Road to Moscow. Imperial Demesnes. Singular Custom at Tosna. Peasants' Ice-Cellars. Novgorod, its Decline. River Msta. Shoes of Bast. Sect of the Strigolniki. Boulders. Frequency of Oak. Elevation of the Valdai. Bell Manufacture. Yedrovo. Log Roads begin. Canal between the Volga and the Neva. Vuishnyi Volochok. Internal Traffic by Water. National Songs. Caravans from the Ukraine. Peculiarity of the Cattle. Torjok. Leather Manufacture. Cultivation of Cherries. Wines of the Don. Great Monastery. Tver. Improved Landscape - - - - - - - 68

CHAPTER IV.

Moscow, its Colossal Character. Frequent Conflagrations. The Kremlin. Old Palace of the Tsars. The Great Bell. Chinese Town. Peculiar Kind of Industry. Serf Market. Manners of the Grandees — their Amusements. Road from Moscow to Bogorodsk. First Appearance of Rock. Platova. Paintings in Pokrof. Vladimir, Signs of its ancient Greatness. Murom. Trade on the Oka. Hives in the Trees. Doskino. Nijnei Novgorod - - - - - - Page 87

CHAPTER V.

Nijnei Novgorod. The Great Fair. Market Buildings. Armenians. Bokharians. Cotton Trade. Fable of the Lamb-Plant. Bokharian Shawls. Chinese Quarter. The Mordvi. Numbers frequenting the Fair. Amusements. Physical Features of the Country. Banks of the Volga. Fall of the Banks. History of Nijnei Novgorod — its Trade. Makarief. The Grusinski Family. Luiskovo. Revenue from Makarief—and from Nijnei. Value of Importation. Population. Taxes - - 106

CHAPTER VI.

Departure from Nijnei. Troops of Exiles. Vasili Sursk. Indigenous Tribes. Oak Forests. Dress and Superstitions of the Cheremisses. Bieloi Vrag. The Chuvashes. Their Dress. Their Timidity. Women's Ornaments. Svajik. Religious Procession. The Tatar Population. Passage of the Volga. Kasan. The Fortress. Fur Market. Fruits from Bokhara. Pistachio Nuts. Caviar. The Tea Trade. University of Kasan. The Tatars. Evening Service in the Mesjid. Tatar Houses. History of Kasan. Surofzof's Researches - 130

CHAPTER VII.

Churilin. Arsk. Metyeshka. Tatar Burial-Ground. Symptoms of Approach to the Ural. Rock at Yangul. Malmuish. Gold found here. Fossils. Bear Hunting. River Vyatka. The Votyaks. Heights determined. Effect of Forests on the Climate. Suri. Iron Works of Votka. Cast Steel. Ije. History of Sobakin. Mode of making Fire-Arms. Mixed Population of the Country. Sosnovka. Migration of Serfs. Road to Dubrova. Elevation of the Ground. Tortuous Course of the Kama. Dubrova. Okhansk - - - - 160

CHAPTER VIII.

Perm, its simple Style. Rapidity of the Kama. View across the River. Mines of Achinsk. Mode of Working. Precautions against Fire. Great Extent of the Copper Ore. Elevation of Perm. Kruilasovo. Gypseous Rock. Kungur. Springs of

Slatoústofsk. Their Temperature. Smelting Houses of Irginsk. Bisersk. Great Elevation. Kirgishansk. Caravan of Precious Metals. Boundary of Asia. Furnaces of Bílimbayefsk. Highest Part of the Road. The Descent. The Ridge of the Ural. Yekaterinburg - - - - - Page 177

CHAPTER IX.

Magnetical Observations. Indications of Two Northern Poles Deviation of the Isoclinal Lines. Increased Intensity. Hansteen's Theory. Irbit. Early Traffic. Lapidaries in Yekaterinburg. Precious Stones. The Old Creed. Licentiousness. Population of Serfs. Aspect of the Town. An Imperial Festival. The Bird Cherry. Journey Northwards commenced. Charcoal Burners. Larch-Woods. Nevyansk. Origin of the Place. Alapayefsk. Magnetic Rocks. Gold. Population of Nevyansk. Wages. Hay Harvest. Constitution of the Mining Districts. Relics in the Castle - - - - 198

CHAPTER X.

Departure from Nevyansk. Forests. Siberian Cedar. Its Nuts. Humble Vegetation. Large-tailed Sheep. Tagilsk. Produce of the Furnaces. Gold and Lead. Varieties of Crude Iron. Copper with Iron. Lackering and Painting. Cliff of Iron Ore. Great Mineral Wealth. Encreased Temperature of the Wells. Importance of this Phenomenon. Origin of the Metalliferous Deposits. Twofold Submersion. The Woods of the Dimidov Family. Climate of Tagilsk - - - - 226

CHAPTER XI.

Laya. Kushva. Magnetic Mountain of Blagodat. Mineral Riches anciently known. Chudish Mines. Iron Ores of Blagodat. Kachkinsk. Distribution of Gold and Platinum. Fossil Elephants in the Metalliferous Deposits. Turinsk. Magnetical Phenomena at Sheitan. Verkhoturie. Fallen Importance of the Place. Bessonova. Northern Limit of Tillage in the Ural. Gold at Latinsk. Rich Produce. Bogoslavsk. Mines of Turinsk. Climate. The Voguls, all Hunters. Return from the North. The Black Spring. Platinum Beds - - 245

CHAPTER XII.

Return to Yekaterinburg. Shartash. Plain of the Puishma. Interior of the Gold Mine. Mining-Field of Beresov. Gold Washing. Total Produce. Winter Life. Maids' Meetings. Foundation of a Nunnery. Veneration for Idiots. Quarries of the Iset. Graving-Lathes. Stone-Works. Jasper. Total Produce of the Ural. Iron Wrought. Copper. Value of the Gold and Platinum. River Navigation. Freight. Rapid Descent. Details of the Voyage down. Bashkir Plains. Laishef. Length of the Navigation - - - - 267

CHAPTER XIII.

Exiles in Yekaterinburg. Kosaks of the Ural. The Bashkirs — their Careless Lives—Lovers of Falconry—probably the Argippæi of Herodotus—Derivation of their Name—their Religion—peculiar Mode of Burial. Evils of Log-Roads. Departure from Yekaterinburg. Sugat. Atmospheric Changes. Tyumen. The Limits of the Lime-Tree. The Nelma Salmon. Great Fertility. Flights of Birds. Yujakova. Exhortations to the Horse. The Irtuish. Arrival in Tobolsk - - Page 293

CHAPTER XIV.

Plan of a Journey down the Obi. Scientific Observations. Results obtained by Boring. Public Buildings of Tobolsk. Style of the Private Houses. Natural Origin of Local Habits. Officers in Siberia. Siberia practically Free. Germans in Tobolsk. Astronomical Observations. The Market. Cheap Furs. Promuisl. Fowling near Tobolsk. Abundance and Variety for the Table. Elevation of the Ground. Its Temperature. Chappe's Observatory. Difference between the Irtuish and Obi - 317

CHAPTER XV.

Easy Navigation to Beresov. Formation of the Snow-Way. No Whips in the Land of Horses. The Gostini Dvor. Chinese Goods. Brick-Tea. Yarkend Goods. Trade with Bokhara and the South. The Route to Tashkend. The River Chui. Tigers in the Steppes. Limit of the Tamarisc. Great Heat of Tashkend. Its Produce and Industry. Exports and Imports. 344

CHAPTER XVI.

The Chief Priest in Tobolsk. Observations on the Site of Chappe's Observatory. Kidnapping by the Kirgis. Their Cruelty to Captives. Their general Character. Schools for the Indigenous Races. Marriage Ceremonies in Tobolsk. Licentious Sects. The Exiles. Magnetic Observations. The River frozen. Preparations for the Journey northward. Ostyak Clothing. Provisions. The Nart described - - - - 375

CHAPTER XVII.

Journey to Obdorsk. The Ice-Road. Forests of the Irtuish. Tugalova. Mode of Fishing. Veils of the Ostyak Women. Ostyak Song. Repolovo. Fish-Skin Windows. Nettle-Cloth. Limits of the Elk and Rein-deer. Opening of the Fishery solemnised. Samarovo. The First Stones in the Plain. Yelisarovo. Fish Trade on the River. Kevashinsk. Draught-Dogs. Conflagrations in the Forests. Reputed Enmity of the Elk and Glutton. Ostyak Bows and Arrows. Kasuimskie Tribe. Dog-Sledges - - - - - - - 400

CHAPTER XVIII.

Sosnov. Fine Pine-Trees. Ice-Windows. Fish-Skin Clothing. Mortality among the Ostyaks. Kondinsk. Official Insolence. Stones in the Obi. Whence they come. Isatskie. Endemic Disease. Aleshki. Unfrozen Springs. Shorkal. Energy of Russian Settlers. The Kasuimsky traced. Kunduvansk. Interior of the Yurt. Ermine Trap. Treatment of the Dogs. Encroachments of the River. Ostyak Observations of the Heavens - - - - - - Page 434

CHAPTER XIX.

Beresov. Pine Woods. Darkness. Hospitality. The exiled Menchikof. His Grave opened in 1821. Perpetual Congelation of the Ground. Coins preserved by the Ostyaks. The Aurora Borealis. Temperature of the Ground determined. Siberian Magnetic Pole. The Mercantile Class. Culture of Grain at Beresov. Peltry. The Beaver. The Trader's Domestic Life. Tatar Traders. Honesty of the Ostyaks. Their Mode of Swearing. Exiles. Moral Improvement of banished and emancipated Serfs - - - - - - - 458

TRAVELS IN SIBERIA.

CHAPTER I.

FIRST THOUGHTS OF THE JOURNEY. — MONUMENT AT PYRITZ. — MANNERS FASHIONED BY MATERIAL NATURE. — DANTZIG. — FERRY OVER THE VISTULA. — KÖNIGSBERG. — ARRIVAL OF SWALLOWS. — THE NÄHRUNG. — MIRAGE. — MEMEL. — THE SAMAÏTES. — RUSSIAN FRONTIER. — MITAU. — RIGA. — BURLÁKS, OR WANDERING LABOURERS. — THE LITHUANIANS. — VALK. — THE ESTHONIANS. — BACKWARD VEGETATION. — DORPAT. — THE OBSERVATORY. — BOULDERS. — COURT OF JUSTICE. — ANCIENT GREEK CUSTOM. — LAKE PEIPUS. — CHUDLEIGH. — NARVA. — OPOLYE.

When, in 1825, I made the personal acquaintance of Professor Hansteen, the Norwegian philosopher so justly famed for his researches into the theory of terrestrial magnetism, he expressed the wish to undertake a journey into the interior of Siberia for the purpose of making magnetical observations. Even then there opened before my eyes the brilliant prospect of being able, perhaps, to take part as an active coadjutor in so important an undertaking. However unsafe the foundation on which these hopes rested, yet they had the effect of making me apply myself from that time forward to studies preparatory to a scientific expedition. It was still desirable that these preliminary labours should be continued for some time longer, when unexpectedly, in the autumn of 1827, the determination of Professor Hansteen arrived at maturity, the Norwegian government liberally engaging to defray the attendant expenses. A request on my part to be allowed to co-operate in

a work scientifically so important, was granted; and I then found myself in the position of being about to start immediately on a journey, without preparation at all commensurate with the greatness of the enterprise, but with as high hopes of success as could be fairly founded on a lively interest in its objects. By the advice of Professor Hansteen, which fully coincided with my own views, I now provided myself with magnetical and other instruments, in order that, if separated from the rest of the expedition, I might still be able to extend the range of magnetical observations, and serve actively in the other departments of physical knowledge.

On the 25th of April, about 5 P. M., we left the gate of Berlin on our way to Königsberg by Dantzig. During the last week there had fallen copious showers, though with the warmth of spring. The poplars on the road-side were already in full leaf, and the elder bushes, with many of the fruit trees in the village gardens, were in like manner clothing themselves in green. When we crossed the Oder, we found the willows on its banks in full flower, and with leaves perfectly unfolded; it may serve also to indicate the relative forwardness of vegetation at our starting point to remark, that the flowers of the horse-chestnuts were completely formed, though the clusters were not yet opened, and that the mountain ash had fully developed leaves.

The left bank of the Oder, on the Freienwalde road, is formed by low meadows exposed to frequent inundation, and bordered by the sandy plains which extend to Berlin; while on the other side steep hills, covered with a deeper and more loamy soil, press close on the river. The superiority of this soil is shown in the arable land about Königsberg and in the fruit trees on the road-side, which flourish to a degree unexampled in the sandy region. Here, also, the com-

pactness of the underlying strata gives rise to springs, one of which, at Pyritz, has obtained some historical importance, since, according to tradition, it was there that, in the year 1124, the inhabitants of Pomerania, at that time Sclavonians, were first baptized.

A monument has been recently erected at Pyritz to perpetuate the memory of the Christian teacher, Otho, Bishop of Bamberg, to whom the civilisation of this quarter is so much indebted. But it is still more gratifying to learn that, on the occasion of the last festival commemorative of that event, several old chronicles having reference to it, were snatched from oblivion and given to the public. Many a striking feature, at least in the portraiture of the now completely extinct Sclavonian branch of the Pomeranians, (Pomoryäni, *i. e. Coast-people*, from *po*, in Russian, on, and *móre*, the sea,) is preserved in these historical records, and few as they are, we learn from them, how perfectly similar were the manners prevailing here 700 years ago, to those which at the present day characterise countries lying much further to the east.*

It is probable that the tract extending from the Oder eastward, along the shores of the Baltic, owes its superior elevation and greater firmness of soil, as compared with the region further inland towards the south-east, to the proximity of the underlying rocky strata, which may be supposed to project here above

* The manners and outward appearance of the Pomeranians in the time of Otho resembled those of the tribes dwelling on the Obi, and of the other indigenous races of Northern Asia at the present day, as perfectly as if a meridian-difference of eighty or ninety degrees were the exact equivalent of a lapse of 700 years in history. The zealous apostle himself was filled with admiration at the honesty and fidelity of the heathen. The Pomeranians ridiculed at that time, in the very terms used now by the aborigines of Northern Asia, the practice, observed with Christian travellers, of locking up their property. Many of the customs in Northern Asia, which strike travellers as being most peculiar, will be found on inquiry to have prevailed formerly in the north of Europe.

the level of the overwhelming sand. Yet the granite-boulders are scattered over the loamy districts in the same manner as on the sandy plains, and here, as in the north of Germany, it is observable that the chief accumulations of drift and gravel are on the northern sides of the hills.

It is an interesting circumstance, that even the subordinate diversities of the earth's surface, such as are here spoken of, exhibit themselves in something more than merely accidental connexion with the local character of the inhabitants. Without venturing to decide whether the soil of these oasis-like districts exercises such an influence as to shape the habits of the inhabitants, or whether previous difference of race gave rise to the difference in the choice of dwelling-places, it is certain that between the inhabitants of Ukermark and Pomerania on the one hand, and of Mittelmark on the other, there is a broad distinction which cannot be overlooked. The dwellings and the clothing, the breed of the draught-cattle, nay, even the tone of the voice, seem here to be exactly in keeping with the nature of the soil.

The phenomenon of a row of hills so elevated as that above mentioned, nowhere disclosing any kind of solid rock, and the origin of which cannot be ascribed to the action of river waters, will seem in this case less surprising when viewed in conjunction with the following circumstances:—

Near Langenböse (April 28.), the first stage beyond Lupof, begin two parallel rows of sand hills, of regular and similar outlines throughout, which extend all the way to Dantzig without any break in their uniformity. They are covered at first with pines, but the beech-clad hills, which give such charm to the scenery of Oliva, near Dantzig, are, in fact, but the continuation of one of the same ranges. On the road by Goddentof, Neustadt, and Katz, the parallelism

of these two ranges is shown so strikingly, that the traveller might suppose himself to be in a valley stretching both ways to the horizon. These are manifestly what in ordinary language would be called two lines of downs, corresponding to the shore of the Baltic, which is now nearly eight miles distant from the outer one. The little rivulet (the Leppe) which flows between the two ranges must not be supposed to have had any thing to do with their formation, but rather as originating itself in the rains and dews collected on their sides. And perhaps it may be laid down as a general principle, that even in what are called alluvial tracts, the form of the country has had more effect on the course of the rivers than the latter on the former.

The interval between those two rows of hills extending from Lupof to Dantzig, is in general from one to two miles. If they be considered as sea-downs, then there arises the question, which, in my opinion, has never been satisfactorily answered, as to the reason of the mounds being thrown up at equal distances. The formation of downs can hardly be ascribed to ordinary storms and agitation of the sea; for in that case the phenomenon would occur more frequently, and not, as in the case before us, only after a period sufficient for the formation of a level strand 10,000 feet in breadth. Even in the neighbourhood of Dantzig these hills attain such a height as to forbid the supposition of their having been thrown up by the waves of the Baltic. The more northern of the two ranges terminates at the shore of the Frisch Haff with the steep hill, on which is erected the picturesque castle of Katz. The southern one continues through the hills of Oliva.

We arrived in Dantzig on the morning of the 29th of April. The alleys of horse-chestnuts which lined the latter part of the road that led through the midst

of opulent country houses presented a far more wintry aspect than the same kind of trees showed in Berlin a week before. Here were only the first traces of young leaves; but in Berlin we had seen the perfectly formed clusters of flowers just ready to unfold.

It was not without some sadness that I paced the streets of the town, bidding farewell for an indefinite period to the land of my home, the peculiarities of which are so fully expressed in the style of building and general aspect of Dantzig. The solemn gloom of the streets formed by the gables of high, narrow houses; the projections to the footway, with the benches, and the trim balconies, where neighbours converse together; the tall lime trees, giving shade in summer; and the wells, with their promise of refreshing coolness, altogether composed a picture of citizen-comfort and well-being which contrasted strongly with my prospect of wanderings in strange, and, as I then conceived, inhospitable lands.

At noon we proceeded by a road no longer unpaved through the miserable villages between Dantzig and Dirschau. It goes over a dry, somewhat elevated tract of loamy soil, which runs along the left bank of the Vistula, and is commonly called the Height, to distinguish it from the Hollow on the right bank, which latter has a marked superiority in point of fertility, and the consequently prosperous condition of its inhabitants. At Dirschau is the short but steep descent from the elevated plain to the ferry of the Vistula. Here the passage of men and vehicles across the river is effected in a way as ancient probably as it is simple, but which, in the strong currents attending the spring-floods, can hardly be deemed the safest.

A cable is stretched across the river, and, by means of this, the ferry barge, lower down the stream, con-

trives to make its way across, not, however, being made fast in any way to the cable, but hauling with lines, which are made alternately to fasten and to loose their hold on it. The ferrymen wear great hempen bands, like soldiers' belts, over the breast and left shoulder. At the lower part of this band is fastened a light line with a weight at the end. Standing at the bow of the barge, one of the ferrymen throws his line, which, falling over the cable, and making some turns round it, owing to the weight, holds it fast. The man then begins hauling, and by the time he reaches the stern of the barge, one or more of his comrades have in like manner taken hold of the cable with their lines, and are hauling in the same direction. He then detaches his line, and returns to the bow to repeat the operation. Care is taken that there shall be always at least two lines holding at once on the cable, so as to keep the barge in a course parallel to it. But in floods, when the current runs strong, it is often impossible to haul on the boat with her side to the stream; in that case, the workmen, overpowered, have no alternative but to let her go adrift.

Our stay of four days in Königsberg, where we arrived on the 30th of April, was rendered important for the purposes of our journey by observations of the magnetic declination in that place (which now enjoys a kind of classical celebrity in the history of scientific measurement), and also by the repeated comparison of my chronometer with the observatory clocks.

Here, on the 3d of May, the willows were still quite without a flower; but at Freienwalde, eight days before, we had seen the flowers of river-side willows completely developed. The house-swallow (*Hirundo domestica*) made its appearance at Königsberg on the 30th of April; consequently, on a day which, according to the four and twenty years' observations of

the curate, M. Sommer, has a temperature of 6°, 64 R. At Gosport (in lat. 50° 50′), the 20th of April is the day of the swallow's first appearance, with a variation of only seven days in the course of twelve years. The temperature of that day is there 7°, 80 R. At Berlin, (lat. 52° 31′) the arrival of the swallow falls, as would appear from observations made for six years, on the 18th of April, when the temperature is about 6°, 32 R. At Apenrade (lat. 55° 3′) the same phenomenon occurs on the 23d of April, with a temperature of 6°, 31 R.; at Copenhagen (lat. 55° 41′), on the 5th of May, when the temperature is 7°; 21 R.

Since it is remarked throughout Europe, that for this phenomenon of animal nature, as for the several stages of vegetation, there is a near coincidence of the accompanying temperatures, the question naturally arises, whether the great differences observed in Asia, in the time of the first appearance of the house swallow, depends on the warmth of the air. At Guryef, on the Caspian Sea (and in lat. 49° 6′), the swallow is seen as early as the end of March, while in Dauria, beyond Lake Baikal, in the same latitude, it does not make its appearance till the second week in May; and at Turukhansk on the Yenisei (in lat. 65° 45′) not till the middle of June.

In the afternoon (May 3.) we left Königsberg on our way to Memel by the Nährung, as the narrow tongue of land is called which separates the Kurische Haff, or Gulf of Courland, from the Baltic. As far as Mülsen the road went through a tract of rich grass land, in which the fir tree predominated, announcing here, as throughout Germany in general, the presence of a good soil, or an oasis in the sand. Thus, in the dry plain between Munich and Ratisbon, the firs take the place of the pines, only where hollows collecting the moisture give rise to the formation of a considerable layer of mouldy soil.

By sunrise (May 4.) we had reached Schwartzort, a stage situate nearly in the middle of the Nährung. We had here a fine view of the Haff or Gulf, which was rendered still more interesting by the phenomenon of a very distinctly marked irregular refraction. The line defining the horizon of an observer standing near the water's edge appeared in one place to be broken asunder by elevated images of distant objects, while in another, those images were attended by others, turned upside down and suspended in the air. Joined to this was that tremour of visible objects which is so often observed on wide plains in the early part of the day, in consequence of which the lower images, as well as those apparently hanging in the air, were kept in violent undulation, and seemed to have a progressive motion in the direction of the wind.

A particular circumstance made this sight still more striking. The Haff swarmed, at some distance from the shore, with flocks of ducks, which, as the inhabitants related, had taken possession not long before of those portions of the gulf just freed from ice. These birds with their peculiar kind of flight, were perpetually hurrying in pairs, back and forward, almost always in a straight line, just above the surface of the water, and their movements blended in an extraordinary manner with the undulation and vibration of the optical rays. It was easily seen that in this case the condition required for the theoretical explanation of this kind of mirage, which is, that the stratum of air next the earth be warmer than that lying immediately above it, was completely satisfied. For the extremely copious fall of dew on the Nährung showed us how much the ground had cooled during the night by radiation; but the water of the Haff retaining its heat became at length warmer than the land, and the stratum of air resting

immediately on it was covered by colder streams of air from the shores.

In order to travel with more facility along the solid, sea-beaten strand of the Baltic, we had to cross a range of hills which separated us from it. Six horses had enough to do to drag our carriage, which was by no means heavy, over the hill, so deep was the fine sand. The height of these hills will not allow us to suppose that they were thrown up by the waves of the sea.* The light sand driven by the wind has formed their covering, but a more solid nucleus occasioning their formation may be supposed to have previously existed, in the case of the Nährung, as well as in that of the row of hills near Dantzig and Königsberg, which close observation shows to be a continuation over the interior country of that remarkable tongue of land. A geognostic phenomenon, which appears to me to indicate, particularly as regards the coast of the Baltic, between Dantzig and

* There is a tradition or belief current among the people on this coast, that the coast of Sweden at Stockholm may be seen, under favourable circumstances, from the highest point of the Nährung, the distance between the two places being 250 geographical miles. To show the groundlessness of this belief, it is sufficient to observe that the Island of Gotland lies between the two places. If we suppose that the land said to be seen is the nearest part of Gotland, distant 120 geographical miles, then we have an instance of an extraordinary and quite unexampled amount of refraction. For, if the point on the Nährung be 350 feet high, that on Gotland 800, and the rays of light between them be affected with the ordinary refraction, (or so that the object be raised about an eighth of the arc of the earth's surface between the two places, according to the observations of Woltmann, Brandes, and Tralles,) then the greatest distance at which those points would be reciprocally visible would be 58 miles. This limit would indeed be exceeded in case of that extraordinary refraction which produces a second image. The most remarkable example of this phenomenon distinctly recorded is furnished by Biot, who observed the signal fires on Iviça from Formentera, the limits of visibility being increased in this case from 92 to 108 miles. If we increase the 58 miles above mentioned in the same ratio, we shall have 68 or little more than half of the alleged extent of vision. The opinion, therefore, of the inhabitants of the Nährung is a paradox: but it would be worth while to investigate the source of the delusion.

Memel, the existence at no great depth below the sand of an older and more solid formation, is the amber washed on shore by the waves, particularly along this tract; for the throwing up of this fossil in the same place during two thousand years appears to us hardly conceivable, unless it be assumed that there here subsists a peculiar (brown coal) formation, which inland being covered deep with sand presents to the sea the bared edges of its strata. It is to be hoped that hereafter some positive results may be arrived at by boring, respecting the position, extent, and other circumstances of this formation, which is of so much consequence to Prussia.

The monotony of the dry and desert strand was interrupted only by different-coloured streaks on the ground, which caught the eye, and seemed as if they were regularly drawn in straight lines. The cause of this appearance was easily detected. The sand along the shore consists of grains of quartz, in general perfectly white, extremely fine, and easily driven by the wind; and also of grains of reddish feldspath, a great deal coarser and more immovable. Hence it happens that on all the ridges exposed to the wind, the heavier and red grains alone remain, while all the furrows and sheltered places are filled by the white sand.

As we approached the end of the Nährung, we saw Memel spread before us on the opposite shore at the mouth of the gulf, which is barely a nautical mile wide. Here they dare not venture to trust themselves to the mode of crossing ferries which is usual in Eastern Prussia, but sail and rudder are used instead of the guiding rope stretched across the water. It is a singular custom that, on landing in this town, the horses are not put to the carriage, but the ferrymen yoke themselves to it with ropes, and draw the traveller to his destination. The oldest

among them, who is the steersman of the barge, takes the lead on land, guiding the carriage by the pole.

There was something extremely interesting in the lively traffic which was to be seen here in the port, notwithstanding the early season of the year. The quay towards the Haff, on the west side of the town, seemed to be occupied wholly by river-craft, which bring down the produce of the country by the Niemen, from as far as Grodno, which is about 160 miles inland, while the northern quay was given up to sea-going vessels. The latter exhibited most plainly the peculiar significance of the Baltic ports in general, and of that of Memel in particular. Along the shore is the market, abundantly furnished with every thing required in this part of the world; and there one may see in the motley throng the merchants, attracted by the imported goods, mingling with English and German sailors, and with the crews of the boats from the interior. It may be remarked, that the trade of the Baltic ports has more of the character of immediate barter than that of most other maritime places.

The eyes of the stranger here are particularly attracted by the appearance of the Samaïtish country people.* All of them, women as well as men, come to the town on horseback, and they are broadly dis-

* The inhabitants of the tract named Samogitia. The very names of this little district and its possessors remind one significantly of the name of the Asiatic Samoyeds, which again is considered, on good grounds, to be identical with the name Samolain, which the indigenous inhabitants of Finnland give themselves, and which, being derived from Sama, a swamp, signifies the inhabitants of swamps or fens. No one ventures any longer to derive the name of the Samoyeds from Russian, and to suppose it to signify *self-eaters*, that is, *cannibals*. The Samaïtes of this place, therefore, like the Same-landers, as they are called in the immediate neighbourhood of Königsberg, may be reckoned among the branches of the widely spread Finnish race. Some Finnish sailors who had landed near Memel in 1812 from a Russian ship-of-war, related to me how they were struck with the evidence of relationship between the inhabitants of that coast and their own countrymen.

tinguished by their costume from the German population. They still wear the cloak of grey cloth, made of unbleached wool, as constantly as they did in the 16th century, when Herberstein saw them. Their shoes are very low, and are fastened to the feet by two leathern straps wound round the legs. The breed of their ponies has reached the extreme of diminutiveness. They themselves also differ widely from the Lithuanians, who are here numerous, by their much smaller size. From this neighbourly intercourse between two races differing so much in physical endowments may perhaps be explained a striking remark which Herberstein made, probably from his own observation, with respect to the inhabitants of ancient Prussia. He relates of them, as a very curious circumstance, that they are of the most various sizes, so that one sees among them at one time, and indeed more frequently, men of good stature, and at another exceedingly small men, such as might be properly called dwarfs; and this he considers not merely as an accident, but as a national peculiarity.

It was not without some anxiety that we approached (May 4.) the Russian border, which is but a few leagues from Memel: for we had reason to fear that our carriage, filled with mathematical and philosophical instruments, might puzzle and surprise the officers on the frontier. On the left of the road nothing was to be seen but a naked desert of loose sand; on the right, the cultivated fields and pine forests bounding the bleak plain were discernible in the remote distance. On this dreary plain are fixed the bars which serve to mark the boundaries of the Prussian and Russian dominions. At one of those, on the Russian side, we could descry, at a good distance, projecting above other objects, the lance of the Cossack sentinel. On our approach the barrier was

half raised, and then immediately lowered again, so that while room to pass through was barely allowed us, we were, at the same time, led to think on the importance of the step. With a bearded Cossack riding by our side, we proceeded as rapidly as possible to the nearest custom-house in the village of Polangen.

Here we were required by the subordinate officials, in the first place, to furnish a list of our instruments, setting forth the proper denomination of each, in order that the duty payable on them might be ascertained. It happened, however, that their names were not to be found in the tariff; the chiefs of the office met therefore to deliberate on the matter, and concluded by sending us the very gratifying and unexpected intimation that there was nothing to prevent our proceeding. The inhabitants of this place are for the most part Jews, enticed hither perhaps by the advantage of watching on the frontier the fluctuations of their petty trade.

On the 6th of May we reached Mitau, a thriving little commercial town, in which there is nothing likely to startle the traveller from south-western Europe, except, perhaps, the great predominance of wooden houses. At daybreak on the 7th, after a rapid and unimpeded journey on a level road, we arrived at the left bank of the majestic Dwina. A low bridge of boats conducted us across the river, here about 900 paces wide, to the suburbs of Riga.

On the side of the bridge lay a numerous array of two-masted ships, crammed close together, with their bowsprits projecting far over the road. On the other side, towards our right, were flat-bottomed boats, laden with corn, and which had brought their tributes down the river. There was still the silence of night among the ships, through the midst of which, singularly enough, our road led us. We had, how-

ever, a proof of the activity of the traffic that prevails by day among the vessels of various kinds exchanging produce, in the great number of labourers who were sleeping in the open air, partly on the ships' decks and partly under their bows on the bridge, close to the carriage-way. In the town, also, we saw on the steps of a handsome Gothic edifice, which serves at once for an Exchange and Town-hall, numbers of these northern lazzaroni sleeping soundly under the canopy of heaven, regardless of the pinching cold and heavy dews of spring. These were Russian peasants, easily distinguishable from all others by their long hair and beards, but more particularly by the remarkable breadth of neck and throat, and by their thickset figures. Most of them carried a broad adze in the belt which girt their clothing, showing that they were carpenters.

In the Baltic provinces these wandering labourers, who crowd to the ports in the spring of the year, when the shipping business is active, are called Burláks, a name not capable of explanation from the Sclavonian family of languages. These people, if they come from the southern governments, are serfs, who, for an annual payment in money, obtain leave from their owners to rove at liberty for a certain time, and in this way they escape every year from prædial servitude, purchasing their brief freedom, however, by renouncing the ties of home and kindred. Yet many of the Burláks found here are domiciled in the Baltic provinces, where, vassalage being abolished, they prefer a settled to a wandering life.

In Riga are to be seen all the productions of Europe calculated to minister to the wants or the luxury of the Russian people. But the objects of trade which are here most likely to engage the attention of a stranger are those indicative of national

manners, and scarcely ever met with in any other part of Europe. The Russian Shops, properly so called, present to view a number of cellars filled with an assortment of articles used by the Russian peasant exclusively; such as mats of lime-bast, Russian leather for cart-harness, bells, and the peculiar horse-collar suited to their mode of yoking; birch tar, also, which is rubbed into the leather to make it water-proof; and, without fail, a sort of leathern mittens of immense size, which are worn by all the men who have any thing to do with driving.

These things are all adapted to the wants of humble and laborious life; but, in striking contrast with them, we find here another kind of merchandise, equally characteristic of the nation, and which, to the stranger arriving from Germany, is quite a novelty. Under the title of Fruit Shops, or Stores, are seen here, in extraordinary number, places where fruits, almost exclusively the productions of more southern climates, are offered for sale. To say nothing of oranges, of which the Russians are passionately fond, the fruits of Southern Russia, and of the contiguous Asiatic provinces, are in great abundance. They are partly imported dried; but, in part, they owe their preservation on the long journey to the very circumstance which prevents their growth in the country to which they are brought. For it is in the depth of winter that the fruits of the southern provinces, apples, pears, melons, and even grapes, are carried in the first instance to Moscow, whence they are sent as far west as the direct Russian trade extends, or perhaps as far as the national fondness for these productions creates a brisk demand for them. This lively, and, to us, startling trade, may perhaps have helped to invest Riga, at least as it appeared in our eyes, with the air of the south, and to make us fancy that some sunny land with its in-

habitants had been planted here by mistake in the 57th parallel of northern latitude.

But the true origin of this involuntary illusion was undoubtedly the lively impression made upon us on our first coming into contact with the Russian people. We witnessed the awaking of the labourers who had roved into the town, and lay dispersed through the various open places, and we remarked in their first interchange of words with one another a vivacity of voice, looks, and gestures, expressive of quick and passionate feelings, such as, in conformity with preconceived notions, we should never have expected to find in frost-bitten hyperboreans. We now perceived the value of the opinion pronounced by Madame de Stael on the occasion of a journey through Russia; for, without regard to historical proofs, but merely from observation of the manners and character of the people, she was led to conclude, as an unquestionable fact, that the Russians issued originally from milder climates.

Several branches of retail trade are here exclusively in the hands of Russians; but, clever as these people are in this kind of business, they appear to be but little qualified for the management of extensive mercantile concerns. All the great commercial houses in Riga belong to Germans or other foreigners. Even of the numerous manufactures prospering in this place but a few are carried on to any extent by Russians: They are very expert, for example, in preparing and dressing leather, which is cheaper than German leather, and, for many purposes, better; and hence boots and shoes, and other articles of leather, are offered for sale almost exclusively by Russians. There is another occupation in which the Russians are distinguished, of no importance as regards the foreign or export trade, yet worthy of mention—this is the forcing of fruit and vegetables,

by rearing them on hotbeds or in heated rooms. A great number of Russian peasants are engaged in this business in the immediate vicinity of the town, and particularly at the foot of the mounds thrown up partly as a protection from the inundations of the river, and partly for defence in case of war. It surprised us to find that asparagus was here no rarity, even in the middle of winter; but by the inhabitants this was considered as a very trivial instance of the gardener's art. The cheapness of wood may contribute a good deal to foster this kind of industry; yet it is impossible to overlook the fact that the people have an especial liking for it, a fact that becomes more manifest the further we advance; for we shall have to relate the pains taken by Russian peasants settled in the valley of the Lena, not far from Yakutzk, to rear gherkins (of which the people here are particularly fond) from seed in a hothouse, and to ripen them sufficiently by the powerful rays of the sun during the short summer.

But, apart from this artificial forcing, the general appearance of vegetation in Riga is but little behind that of Northern Germany. The forest trees of Berlin are all to be seen here, although some of them indeed are comparatively rare. The villas on the banks of the river, a little above the town, are adorned with beech trees, which conspire with the rocky cliffs to form some pretty scenery. In front of the gates are oaks, and rows of limes and horse-chestnuts.

German is still exclusively the language of conversation with the educated classes in Riga. There are, indeed, few Russians in the place above the rank of subordinate officials. The acquirement of the Russian language, nevertheless, has been recently made indispensable in the gymnasium established here.

About 5 o'clock in the afternoon (May 7.) we left Riga, and passed during the night over a level tract,

close to the sea-shore, and inhabited exclusively by a Lettish population. Here the uninterrupted duration of the nocturnal twilight was very remarkable, and to persons not used to it, might seem, as the broken clouds occasionally disclosed the northern horizon about midnight, to be a distant fire. In fact, constant twilight begins here on the 23d of April; in Berlin, not till the 17th of May. In the latter place long twilight is associated with the warmth of summer; so that as we travelled northward, and found that our nights grew brighter the more we retired into winter, the change wrought on our feelings with double force.

Notwithstanding our imperfect means of making ourselves understood by our Lettish driver, we yet contrived to learn that in his language the morning dawn is called *Wakergast*. Here the affinity with the German *wecken* (the English *awaken*) is manifest, and yet the Lettish-Lithuanian race is that which, among the various inhabitants of the Baltic provinces, comes nearest to the pure Sclavonian stock, belonging, indeed, to the branch named the Vends. Here, then, there appears to have been some intermingling of the two races, the German and Sclavonian, which are generally assumed to have remained completely separate.

The commodious arrangements of the post-stations, and of the requisite buildings on this part of the road, remind the stranger that he is now in a land where travelling has long been a very general and important branch of business. In spite of accidental drawbacks and occasional local difficulties, it is impossible to overlook the effectual anxiety of the government to provide for the safety and comfort of travellers. The walls of the post-houses are hung over with written regulations, many of them on time-stained paper, and of a date when one would

not expect to find proofs of care bestowed on such matters. A book ingeniously secured from defacement lies to receive the travellers' written complaints. We hardly expected to see the Lettish drivers and couriers so frequently accused of theft, fraud, and drunkenness as has been done for ages in these documents, which yet we fear prove undeniably the moral failings of the people inhabiting the Baltic provinces.

(May 8.) At Valk, a stage 140 versts from Riga, the Esthonian language suddenly and exclusively takes the place of the Lithuanian. Here it is, therefore, that the traveller from the west first meets with clearly recognisable remnants of the Hunno-Finnish race, who, formerly spreading further into Europe, now occupy so large a portion of the north, from Finnland far into the interior of Asia. One often hears applied to these people (the Esthonians) the Russian discriminative term Chukhontsi, Chukhni, or Chudi — a word supposed by some learned Germans to be a proper name, but which really signifies *a stranger;* and its application in this instance may, perhaps, serve to prove, that the Sclavonians thought that among all their neighbours this was the tribe which differed most from themselves.

On this part of the road the comparatively backward state of vegetation was very perceptible. The willows showed the first signs of leaves, but were without flowers. The white birch, which became more predominant the further we advanced, and contributed more and more to form the character of the landscape, had, on dry ground, the aspect only of withered, leafless brushwood, but under hills where there were springs it looked greener, and had even developed leaves. Here we saw, for the first time, fully and frequently manifested, the phenomenon which so strongly characterises northern regions, of

vegetation forwarded by the superior warmth of the spring-water. In the north of Germany one may, indeed, see small plants, such as prefer moisture, remaining green in the middle of winter, in the vicinity of springs; but extensive tracts of marshy land, in which the growth even of trees is promoted by the heat retained in the water, never meet the eye there as they do in this country. As the springs here promote vegetable life in the early season, while the ground in general is still frozen, so they must serve in autumn to protect vegetation from the influence of the approaching cold; for we observed on the willows and birches of the marshy grounds large withered catkins of the preceding year—a clear proof of a second flowering commenced in autumn and overtaken by winter. Nothing of this sort was to be seen on the dry ground, where no plant as yet gave signs of returning life.

Villages are as rare here as in the parts of Courland and Esthonia previously passed through. The great inclosures of the post-stations afford the only human habitations which the traveller meets with. These are all built of wood, and are as much akin in plan as in purpose. A dwelling-house in the middle is surrounded by stables and other offices, forming a square. A wooden post in front tells the distances to St. Petersburg and Moscow, the foci of the empire. Sixty or seventy horses are kept at these stations, and yet it often happens that they are all engaged, and the new comer must wait some time before he can be supplied. The general use of public conveyances or diligences, which are now not uncommon in the Baltic provinces, would effect a great saving of horses and labour; but the characteristic passion of the Russians, not for travelling merely, but for travelling quickly, calls incessantly for a more liberal equipment of the posting establishments. It must at the same

time be remarked, that in general the horses here are smaller and weaker than in western Europe, so that a greater number of them are requisite to represent a given power of draught.

Early on the morning of the 9th we reached Dorpat. Independent of the interest attaching to this place on account of its exclusively scientific destination and importance, an agreeable impression is here made on the traveller by the care taken to embellish the public edifices; by the natural sweetness of the site and the vigorous vegetation, industriously promoted as a means of ornament. A range of hills, about 200 feet in absolute elevation, rises abruptly from the level plain through which the little river Embach winds. The south-eastern slope of the hill was selected by the first settlers for the site of the town, which now lies chiefly in the crescent-shaped plain between the hills and the Embach, which here turns from a southerly to an easterly course. The public edifices, those of the university included, are built of cut stone, in a grand and pure style; forming straight and broad streets, they encompass the private houses, most of which are but one story high and built of brick or wood; but the bright colours with which they are painted, and the good glazing of the windows, gives them a cheerful air. Every thing seems adapted for people who are in good circumstances and content. A granite bridge over the Embach, which is navigable up to Dorpat, adds not a little to the appearance of the place.

The vegetation here was in a very forward state for the time of the year, owing either to the fertility of the soil, a ferruginous marl, or to the protection from the north wind afforded by the hills. Black poplars, which here attain a good height, had their catkins completely formed. On the mountain ash, the leaf buds were opening. Striking as was the

contrast of the vigour of vegetation here displayed with the withered bareness of the open plain which we crossed yesterday, where even the close neighbourhood of springs did not give the trees strength enough to cast off their last year's leaves, yet the difference of latitude between Dorpat and Berlin was rendered apparent, in spite of the former's local advantages, by the retardation there for eighteen or twenty days of like phenomena of vegetation; for fifteen days before (on the 24th of April) the leaves of the mountain ash were already fully developed at Berlin, while at Dorpat it seemed as if a few fine days were still required to unfold them. Thus it would appear that at these two places the same development of vegetation accompanies equal meridian altitudes of the sun. .. For at Berlin on the 24th of April the greatest altitude of the sun is about 50° 26′; while at Dorpat it is on the 14th of May 50° 20′, and on the 15th, 50° 35′. Yet we must not raise this inference into a general principle without further and more careful examination, since equal meridian altitude of the sun produces, at places under different parallels, only equality of noontide heat, but not of mean temperature, or the total influence exercised by the sun's rays.

The broad crown of the hill, adorned by numerous avenues of trees, is called Cathedral Place: the ruins of a church destroyed in 1775 by a fire which consumed nearly the whole town, explains the origin of the name. Some buildings belonging to the university —the library, the medical school, and the celebrated observatory — give importance to this locality, and impress its image on the memory. As the observatory, from the character of the work done there, is ranked among the most valuable of the possessions enjoyed in common by scientific Europe, the duty of describing it does not properly devolve on

the hasty passer-by. Of the great refracting telescope, the colossal work of Fraunhofer, a description and drawings have been already published by Professor Struve, as well as of the excellent manner in which it is mounted. An iron roof revolving round a vertical line, so as to afford complete protection from the weather without hindering the view of any point in the heavens, was constructed after the design and under the superintendence of M. Parrot. Although previously acquainted with the principle of this work, we could not help feeling surprised at the ease and precision with which the whole roof and the telescope at the same time are moved; one hand is enough to impel and guide the apparently ponderous machinery.

We saw also some of the apparatus which had been used in measuring a portion of the meridian of Dorpat. This operation, extending from Hochland (in the Gulf of Finnland) to Jacobstadt, a distance of 188 geographical miles, must be ranked among the chief attempts made to determine precisely, by means of trigonometrical measurement united with astronomical observations, the curvature of the earth's surface. Dorpat had been previously connected with Memel, and Hochland also with St. Petersburg, by the labours of General Schubert. It only remains, therefore, to connect, near Memel, the Russian measurements with those executed in Prussia, in order to arrive at an exact knowedge of the arc between Paris and St. Petersburg, and to learn how far it deviates from theoretical regularity.

This measurement may on other accounts become highly important, though certainly only for remote posterity, if it be continued, as now intended, across the sea and through Finnland. That the bounds between land and sea on both sides of the Scandinavian peninsula are undergoing, in the course of time,

continual change, is a fact as certain as it is unexplained: it seems proved that the recession of the water from the land is equal, on the opposite coasts, for places situate in lines drawn perpendicular to the main axis of the peninsula, but that the actual amount of the change decreases southwards. It remains then to be determined how far the phenomenon observed in the Bothnian Gulf may be traced also in that of Finnland. If it proceed from forces which now elevate some portions of the solid crust of the globe, as appears to have taken place with regard to nearly all parts of it in early geological periods, then the similarity between Finnland and Scandinavia in geognostic constitution would lead us to infer for the former the same changes which are observable in the latter.

An exact survey of the coast made at a known time will enable posterity to decide on this question; for as in many places on the shores of the Baltic the land rises with a very gentle inclination, it may be expected that the slightest change in the level of the line separating the land and sea will be rendered very conspicuous when measured in the horizontal plane. Indeed it were to be desired that the absolute height of the points least liable to change should be accurately determined within the area already so perfectly surveyed in the horizontal direction, and especially the level above the sea of the lakes in Finnland and Livonia. Such an addition to the geodetic labours already completed would, if published, draw the attention of scientific men to an important question, and aid them hereafter in its solution.

It is not by the map alone that we are here reminded of our near approach to Finnland, a country so remarkable in the geognostic point of view: several circumstances indicate the relationship of the land in which we have arrived with the neighbouring region

towards the north. On the northern slope, and on the summit of the hill of Dorpat, lie boulders and blocks which have come from a distance, and are as thickly strewed here as on the principal heights in the north of Germany. But to the general character of this phenomenon, which has been so well described and estimated by Von Buch, is here added the peculiar circumstance that the common origin of these newcomers is much more recognisable from their similar nature than in northern Germany. In the latter country, granite and other primitive rocks predominate certainly among the scattered fragments; yet blocks of other and even recent formations are not wanting: here, in Livonia, on the other hand, the blocks are all granite, and so much alike that one cannot doubt that they are here near the place of their common origin, whence they were spread abroad. We find here nothing but fragments of Finnland granite thrown across the narrow gulf, which perhaps did not then exist, by some unknown force; while in northern Germany many kinds of rock, all coming from the north, and mingled during the longer passage, lie scattered promiscuously. In Livonia we see fewer instances of the reduction of granite to the state of sand than in northern Germany. If all the sand between the Netherlands and Frauenburg in Courland, and which extends in some places to the yet unfathomed deep, were all brought back to its original form as solid granite, it would make an immense mountain group. At the time when this was destroyed, the larger fragments fell near their original position, while the comminuted portion of them, that is, the sand, spread thickly over a wider tract and at a greater distance.

We remarked in the granite blocks round Dorpat a tendency to break into spherical forms, which was still manifest on their worn surfaces, and M. von

Engelhardt told us that he had frequently observed in Finnland, granite with a structure as decidedly spherical as that of the remarkable Corsican stones.

It was painful to be obliged to leave Dorpat so soon, for, owing to the particular attention paid in the University to the physical sciences and natural history, this place offers great advantages to one who seeks information preparatory to a journey through the Russian empire. Geology, botany, and zoology, with general physics and chemistry, are here represented respectively by men, whose learning and obliging disposition are equally calculated to make an indelible impression on those who visit the place. It was here that Professor Eschholz gave me an oral account of a part of Kamchatka, which he had left in 1824. M. von Engelhardt explained to us his views respecting the origin of the alluvium at the Ural mountains, which contains gold and platinum, and for the examination of which he had recently visited that region. The result of his journey was, that he was deeply impressed with the similarity of the mineralogical conditions in the Ural and in South America; and with the likelihood, so important in a financial sense for the empire, that the soil containing platinum in the former region would be found to complete the analogy with its counterpart in the New World, by also containing diamonds.

The shortness of our stay in Dorpat did not allow of our visiting any of the rich collections there, except that of philosophical instruments, which being made for the most part by a Russian artisan, Samoilof, in the workshops of Ijora, an institution established about the same time (1802) as the University of Dorpat, are interesting on that very account. Samoilof wanted the advantages of birth and fortune: he had no education, and never experienced either encouragement or incentive, until, guided by a na-

tural talent, he produced instruments which immediately procured him the favour of scientific men, and opened a wide field for his ingenuity. It is pleasing to see an individual of the native race thus brought forward and rendered active by the scientific establishments of the country; particularly since in Dorpat one grieves to remark, that the learning of the place is of comparatively little use to the country, the language used there being the German—a foreign language, and not the vernacular. The majority of the inhabitants (about 6000 in number) are of the Esthonian race. The University here is distinguished from all similar institutions in Russia, by the freedom allowed to the students, as in Germany, in the choice of their studies.

One of the interesting objects which we had here an opportunity of becoming acquainted with, though certainly only as to exterior and appearance, was a Russian court of justice. The halls in which the district court of Dorpat despatches business form a strong contrast with the outward and visible character of the apartments generally given up in Germany to the same purposes. The darkness and chill of our courts of justice were not long ago proverbial; while in Russia, on the other hand, care seems to be taken to give the tribunals an agreeable aspect. The large rooms are well lighted, kept perfectly clean, and to some extent handsomely decorated. The judges and others employed in the courts bestow as much attention on their dress as military men do among us.

It is curious to observe, among so much that bears the stamp of modern times, a custom of ancient Greece retained here in strict perfection. In the middle of the table at which the chief functionaries sit, stand some triangular prisms, about a foot high and five inches wide, turning on a vertical axis, and inscribed on their oblong, upright surfaces, with

maxims of law. The descriptions given by Greek writers of the ἄξονες, or tablets joined together so as to form a prism revolving on a vertical axis, and on which the laws of Solon were inscribed in the Areopagus in Athens, and also the frequently-mentioned κύρβεις which served for the same purpose, hardly allow us to doubt that we have, in this instance, a usage of antiquity preserved without the least change for two thousand years. These inscribed tablets are here named Mirrors of Justice: they are always kept carefully covered, except when the court is sitting. In former times, while the code of the Sclavonians was short and simple, it was all inscribed on the Mirrors, but at present these contain in general only old legal maxims relating to the duties of the judge.

We left Dorpat in the evening, and in the course of the night reached Torma. In this station we saw what was equally new and disagreeable to us: the insect here named Tarakane (the cockchafer) covered the walls as thick as flies in dirty farm-houses in Germany. There seems to be some uncertainty as to the first propagation of this kind of vermin in Russia. Here in Torma the people were surprised when we assured them that we were not acquainted with the Tarakane, because, as they said, we came from the country whence the insect first spread into Russia. These unwelcome guests, they added, are still called Prussáki, or Prussians, because they first showed themselves on the retreat of the Russians from Prussia at the end of the Seven Years' War. Thus there is reason for supposing that some of the southern nations in the Austrian army had a hand in the propagation of the Blatta, which was checked more effectually in Prussia than in Russia.

Early in the morning (May 10th) we reached Neinal, on the north-western shore of the great lake Peipus. A brisk east wind had raised on it waves

like those of the sea, the effect of which was increased by the numerous masses of ice drifted on the adjacent strand. The ice here, though broken, had as yet lost little of its thickness, while six days earlier, the water of the Gulf of Courland was at night warmer than the land, so great was the decrease of the sun's influence attending an advance northward of only four degrees. The shores of the Peipus are low, and without visible rocky formation; yet this lake as well as the Virzerv, lying further to the west, shows its dependence on that geognostic structure, which is manifested in the other lakes of the Russian Baltic provinces, but is still more conspicuous in those of Finnland. The incredibly numerous lakes and pools in the latter country, are disposed with great regularity, for not only is their greatest length generally from S. E. to N. W., but frequently several of them are ranged, one after the other, in the same straight line. Thus it appears that these lakes represent so many cracks or hollows lying perpendicular to the main axis of the peninsula: they are lateral valleys of the central ridge. In the Scandinavian peninsula the same relation may be observed in the lakes and rivers on the eastern side, and the fiords on the western, which are all so many lateral valleys. If Scandinavia were raised a little higher out of the sea, many of the fiords of the western coast would become lakes, and that peninsula would resemble Finnland still more closely.

The Peipus discharges its waters into the Baltic through the Narva, which not only descends with uniform briskness throughout its course of forty miles, but has also, near the sea, a fall of eighteen feet in perpendicular height. Large blocks of granite lie in great quantities round the shores of the Peipus, annually brought by the ice, as the inhabitants assert, from the bottom of the lake to its banks. In some

places this piece of water is ten fathoms deep, but in general it is much shallower.

Near Chudleigh, four and twenty miles beyond Neinal, the road again meets the shores, at the bottom of a bay encircled by steep cliffs. These consist of thick, regularly arranged beds of a yellowish limestone, containing sea shells in abundance. Below the cliffs are hillocks of debris, which afford an easy access to the strand. From this shoot up tall, slender fir trees, between which the hillocks were still covered with thick masses of snow. As the bay opens to the north, the interior of it is completely screened from the sun by the high cliffs. Wide cracks, made by the frost, gape in lines parallel with the edge of the precipice. Large masses fall every year, and great caution is necessary in approaching the treacherous brink. The limestone rock has here the appearance of a great promontory; for on the east it is bounded by a deep ravine cut by a rapid stream, which falls into the bay. On the right bank of this stream, and on the high ground, stands the castle of Chudleigh, built by and named after one of a body of emigrants from Scotland, some of whose descendants still possess estates round Yeva.

The character of the country continues unchanged to Narva, which stands on the steep limestone hills on both sides of the river Narva, which is here both broad and deep; the current also is strong, but the ledge of rock over which the stream falls a height of eighteen feet is two miles higher up. The mouth of the river is said to afford safe anchorage for merchant ships; and small vessels can ascend within a few miles of the town; for the remainder of the distance, flat-bottomed lighters must be employed. The waterfall just above the town, cutting off communication with the interior by the river, constitutes Narva a central emporium, and is the chief cause of

its importance and prosperity. The imports into Narva are destined exclusively for the supply of the provinces situate on the Gulf of Finnland; and it is worthy of remark that sea salt has been for a long time the chief article of the import trade. One would hardly expect to find on the sea coasts, in a civilised country, such a want supplied from abroad; and considered from this point of view the gulfs of the Baltic seem more like lakes than arms of the ocean.

At day-break, on the 11th, we reached Opolye, 98 versts from St. Petersburg. The Russian population at length begins to preponderate; and in the villages along the road one hears only the Russian language, and sees only the robust figures of long-bearded peasants, who differ widely from the feeble Lithuanians and Esthonians, where these races have remained unmixed. The country is hilly and full of springs; in the marshy flats are thick woods of white birch. In the government of Petersburg, which begins at Narva, the post-houses are better built and more decorated than on the preceding part of the road. Their wooden walls and roofs are coloured red and yellow; they afford accommodation also for travellers who are in no haste to proceed, for inns there are none.

Within some distance of the capital, the road is lined on both sides with country seats, the gardens and shrubberies of which are frequently of great extent. In front of each is a board with the name of the owner, and in order to show its value, the number of serfs belonging to the estate. Notwithstanding all the care bestowed on these villas, their looks at once confess that they are situate in the latitude of 60°. Black poplars and birch are almost the only trees about them, the latter trimmed in hedges after the old French fashion. Prepared as we were by the opulent and tasteful appearance of the country houses,

the first sight of the capital, nevertheless, made an impression on us not easily forgotten. There never was a city that bore so completely the appearance of having been instantaneously created. In travelling to St. Petersburg, through Russia, we see only tedious plains, inhabited by a labouring population, apparently without repose or enjoyment: but that capital itself looks like the abode of a people living only for enjoyment; and so grand is the scale on which it is built, that one might suppose it to have been raised by the united efforts of the whole nation.

CHAP. II.

ST. PETERSBURG.—THE ADMIRALTY.—NEVA.—THE GOSTINNOI DVOR. THE ISLANDS.—CHURCH OF PETER AND PAUL.—CHARACTER OF THE RUSSIANS IN THE CAPITAL.—THE OFFICIAL CLASS.—HEREDITARY RANK.—NATIONALITY.—FOREIGN MERCHANTS.—RUSSIAN MERCANTILE CLASS.—ADHERENCE TO OLD USAGE.—MATCH-MAKERS.—BRIDE SHOWS.—THE RUSSIAN-AMERICAN TRADING COMPANY.—ARTIFICERS.—CHEAPNESS OF LIVING.—THE CLERGY.—MUSEUM OF THE ACADEMY.—CARVINGS BY PETER I.—MAMMOTH'S REMAINS.—METEORIC STONES.—VEGETATION NEAR ST. PETERSBURG.—SCENERY ON THE NEVA.—RURAL TASTE OF THE PEOPLE.

We began our exploration of the Russian empire with the capital, where we had arranged to meet Professor Hansteen and his companion Lieutenant Due, in company with whom we were to continue the journey. The Norwegian expedition, however, encountering numerous delays, did not enter the harbour of Kronstadt, till the 20th of June; and as various preparations for a residence in Siberia were then to be made, we were obliged to remain in St. Petersburg till the 11th of July. My first care was the magnetic observations, of which an account shall be given elsewhere. I then gave my attention to matters most essential, though not of a scientific character. Although I had been allowed, at the request of the Norwegian government, to attach myself to the expedition, yet something more was required, in order that I might continue the journey onward, and then return home from Kamchatka by sea. No less important than the official approval and authorisation of my plans, was the making acquaintance with the chief inhabitants of the capital, who by written introductions to their friends in Asiatic Russia, as well as by various pieces of inform-

ation respecting the remote parts of the empire, rendered me the greatest service.

In the description which I shall now give of St. Petersburg, it shall be my endeavour to represent it as it gradually opened on my view. My excursions through that city were favoured by the finest weather possible, as is usually the case there at that season; for from May to July there is generally a cloudless sky with constantly increasing warmth. The bright sunshine by day and the clear twilight at night are rendered doubly lustrous and enchanting by the numerous broad sheets of water which reflect them.

The Neva, dividing into four arms, about four miles above the sea, forms islands on which St Petersburg is partly built. But the larger and more important part of the city stands on the main-land, forming a square, three sides of which are bounded by water; on the north it has the sea; on the east, the great Neva or westernmost arm of the river, and on the south, the undivided stream which here flows from west to east: it is again divided internally by three artificial canals from the great Neva, which run in curved and parallel courses. This grand quarter, which occupies an area of nearly four miles square, is called the Admiralty, and is the part of the city first approached by travellers arriving overland from Germany.

The eastern portion of the Admiralty quarter, extending along the Neva, is entitled, both from position and the importance of its edifices, to be considered as the centre of the city. Hence no better site than this could have been chosen for Falconet's masterly work, the equestrian statue of Peter I. This stands in the middle of the square, named from it Peter's Place, and opposite to Isaac's Bridge, which connects this quarter with the most important of the islands. Round the square are the Senate House, a

wing of the Admiralty, and the principal front of Isaac's Church, remarkable for its colossal granite columns, so that here all is devoted to objects which the great reformer had much at heart. From this point the survey of the architectural grandeur of the place may be advantageously commenced. A handsome quay of granite, with a parapet, forms the left bank of the river, both above and below Peter's Place, and along it extends, in the latter direction, a row of houses, not to be surpassed in symmetry and magnificence.

Going up the quay from Isaac's Bridge we soon come to the docks for ships of war, enclosed on three sides by the Palace of the Admiralty, which is 1000 feet in length. Beyond that, the quay recommences, and for about a mile and a quarter, as far as the Fontanka, the broadest and outermost of the lateral canals derived from the Neva, it is bordered by the imperial palaces and the gardens between them. The Summer Palace, the easternmost of those ranged along the Neva, faces an esplanade adorned with a brass statue of the hero Suvoroff. Here is another bridge connecting the Admiralty quarter with the islands: it rests, like Isaac's Bridge, on boats, but yet, owing to the breadth of the stream, it has a grand appearance. Then for two miles along the river follow buildings of various kinds, for the most part private houses, but all built of stone and on a great scale.

The view of the Neva is enlivened by gondolas and boats perpetually gliding backwards and forwards; and among the chief pleasures of St. Petersburg may be reckoned a row up the river. As the stream narrows, the buildings on each side appear more colossal: the golden cupolas of the church towers, the glittering windows of the palaces, all seem doubly gay and brilliant when reflected from the clear waters

of the Neva. The impress of perfection, which the above-described streets and buildings along the Neva make on the beholder, is due, in some degree at least, to the circumstance that there is nothing here to remind us of the vulgar wants of life; there is no sign of trade or handicraft; labour is wholly excluded, and the inhabitants here seem to live only for the tranquil enjoyment of their opulence. In the streets one sees only coaches and four, or light open cars drawn at full speed by high-mettled horses; but these are not so frequent as to encroach materially on the solemn stillness of the place, or to withdraw one's attention from the fine forms and massive grandeur around.

The scene was quite changed, however, when we entered the streets which cross the city from Peter's Place. Three of these meet at the middle point of the Admiralty, from which rises a slender tower with a gilt cupola—a conspicuous and advantageously placed mark for the guidance of strangers. Of these streets the most attractive is that running from N.N.E. to S.S.W. and called Névskyi Prospékt. Here for two miles is a double carriage-way, with footways paved with granite on both sides, or avenues shaded with rows of lime trees—the whole having a breadth of 150 feet; so that notwithstanding the great height of the houses, there is here more of the effulgence of broad daylight than is usual in cities.

As far as the Moika—the first of the canals which crosses this street—the lower stories of the houses are converted into shops and warerooms. The foreigners settled in the place—Germans, French, and English—have here carried to perfection the arts of attractive display. Intermingled with them are also some of the southern neighbours of Russia, Persians, Armenians, Bokharians, and Chinese, all exhibiting for sale the productions of their several countries. Near

their shops, or stalls, the air is perfumed with atar of roses, and the eye is caught by the bright colours of the manufactured goods and the gleaming of damasked blades. The vehicles hastening along are here still more numerous than the pedestrians; but the wheels having wooden instead of iron streaks are comparatively noiseless, so that the tramping of horses' feet and the shrill calls of drivers going at full speed to those before them are the predominating sounds.

At the Moika the paved footways terminate, and are succeeded by alleys shaded with lime-trees. The houses in this part are lower, rarely exceeding two stories, but they still form symmetrical groups of tasteful architecture. On the right also, a little removed from the street, and with an open space around it, stands one of the handsomest buildings of St. Petersburg, the Church of the Kasan-Mother-of-God. It presents in front a concave portico, with bronze gates richly ornamented with figures in relief. There is always a crowd here, owing to the reverence in which the image in this church is held.

The third division of the Névskyi Prospékt, from Catherine's Canal to the Fontanka, has a far more singular and characteristic appearance. Here it is that the Russian traffic is seen in all its nationality: the long-bearded dealer offers every thing at the lowest terms, and is often satisfied with half the price which the same goods fetch in other quarters. On the right is a long row of fruit shops, well stored at all seasons with the productions of every climate; and beyond them is the great Bazaar, called the Gostinnoi Dvor, or Merchant's Inn. This kind of establishment is to be found in every Russian town, and is intimately connected with the ancient habits of the people. In former times, when the inclination to a roving life exerted more influence over the

Sclavonians than at present, it was usual to assemble, for the sake of trade, at certain times of the year, in some open places set apart for the purpose, and generally near a great river. In the absence of an organised carrying system, each trader brought his own goods to market. Hence an immense concourse of people and beasts of burden, and the necessity of erecting for their accommodation those inns, which resemble the caravanserais of the Turkmans, or rather which combine the objects of the caravanserais and the bazaars.

The Gostinnoi Dvor of St. Petersburg is a four-sided building of irregular form, its greatest and least sides being respectively 1200 feet, and 350 in length. It contains many hundred compartments for wares and merchandise. A colonnade of the height of the first story goes round the building, and its flat roof affords access to the magazines above. A reservoir in the middle of the court reminds us forcibly of the time when the merchants arrived in caravans, and kept their horses and other beasts of burden in the courts and open spaces within the building. Though every variety of goods is to be seen here, yet things of the same kind are always put together, and hence the names Iron Row, Peltry Row, Book Row, become attached to particular parts or alleys of the Bazaar. From dawn till dusk business is here actively carried on. At night the shopkeepers quit the place, which is guarded by watchmen and dogs. Strings across the doors and shutters are so placed in communication with bells, that should any robber attempt to force an entry, an alarm is immediately given.

Near this building is the Theatre of St. Petersburg, after that comes a palace with its gardens, and, lastly, the bridge over the canal of the Fontanka. Beyond the bridge the rows of handsome houses continue for

about two thirds of a mile, and then we arrive at the coachmakers' quarter. We were told that there are here 200 workshops employed in this business, and that some of them finish sixty carriages in the year. If we allow twenty carriages for every workshop, and reckon them at 500 roobles each, we shall thus have two millions of roobles (84,000*l.*) for the total production of this industrious quarter. The business of the coachmaker and that of the wheelwright are carried on here exclusively by Russians. The continuation of the Névskyi Prospékt terminates near the river, where it flows eastwards, at the famous monastery of St. Alexander Névskyi, from which the street takes its name.

The lateral streets do not differ essentially from that already described: they have, in general, fewer shops and more variety of destination. All the higher houses have flat roofs and stone balustrades, so that the generally received remark of travellers, that the house-ridge rises higher the further we advance northwards, is untrue as far as respects St. Petersburg. The flat roofs are more easily cleared of snow, and on the other hand, the occasional fall of large masses of snow from such lofty edifices, if they had high pitched roofs, would endanger the passengers. The general cleanliness of the streets announces to strangers the activity of the police. The only exception to this is found in an obscure corner of this quarter, approached by narrow passages, where there is a market for old clothes, frequented by the poorest class. It is popularly called Tolkuchni Ruinok, that is, "the higgle-market;" but some descend lower, and having in view the rags there accumulated, and the innumerable vermin inhabiting them, denominate it from the latter. The dealers here are all Russians; a fact which reminds us of the argument wittily urged by Peter I. for excluding the Jews from all such

markets:—"The Russians," he observed, "are too cunning for them, and would rob them of what they had gained elsewhere." In order to complete our survey of St. Petersburg, it only remains to take a glance at the islands and at the right bank of the Great Neva.

Where the river is divided, its chief branch has on the right bank, as we ascend it, first, Vasilief's island for two miles and a quarter. This terminates opposite to the commencement of the royal palaces, being separated by the Little Neva from Apothecaries' Island, which then forms the right bank for a mile and a quarter, as far as the Nevka, the arm of the river which separates it from the Viburg side, as the right bank of the undivided stream is there called. On those two islands, and the Viburg side, are portions of the city properly so called, that is to say, they are inhabited all the year round. In this respect they are essentially distinguished from Krestovskyi and Kamenyi islands, lying further eastward and separated from the larger islands above named by branches of the Nevka, and which are resorted to only during the summer months.

The importance of Vasilief's island may be estimated from the traffic of Isaac's Bridge, which connects it with the Admiralty quarter. On both sides of this bridge are footways, and at certain distances sentry boxes, such as are also to be seen at the corners of the streets. Here, armed with antique halberts, are stationed the policemen whose duty it is to preserve order in the throng of vehicles, and to prevent accidents as far as possible. This, owing to the Russian habit of driving at full speed, is no easy matter, and it is only by perpetually bawling out Právà! (To the right!) that the drivers contrive to get clear of one another; but at night, and in dark weather, it is the

policeman's duty to warn drivers if there be any thing before them.

Going from Isaac's Bridge up the right bank of the river, where there is a handsome quay, faced with granite, as on the opposite side, we first come to the large edifice belonging to the Academy of Arts. Some distance beyond that, are the marine schools, and those of the mining department. Down the river from the bridge on the same side, we find the splendid building appropriated to the Academy of Sciences, and in which is the Observatory. At the southern point of the island is a wharf and landing place, with broad stone stairs. Here we are reminded of the maritime importance of St. Petersburg, by the Exchange, which stands opposite to the stairs, and still more, by two high and slender towers, adorned, like the Columnæ Rostratæ of ancient Rome, with ships' prows, and from which the shipping may be observed as they approach the mouth of the river. The island is laid out with great regularity. Three broad streets run parallel to the river, and are crossed at right angles by sixteen others, called Lines, and distinguished by their numbers, as the first line, second line, &c. It is said that Peter I. intended that this island should be intersected by canals where there are now streets, and that, as he was residing abroad at the time, he sent a sketch of his plan to General Vasilief, who was intrusted with the execution of the works. The latter, however, mistook the Czar's intentions, and proceeded so rapidly, that the houses were all built before he discovered his error. This story may perhaps be best understood as merely a mode of relating, with sprightly embellishments, the extreme haste with which the place rose into existence.

Vasilief's island has long been the favourite residence of foreigners settled in St. Petersburg. Its

north-eastern shore, forming the left bank of the Little Neva, is devoted wholly to shipping. On account of the great and incessant traffic between this island and the Admiralty quarter, Isaac's Bridge (of boats) cannot be conveniently broken or interrupted, so as to allow vessels entering from Kronstadt to pass up the river this way. It is only when a ship of war is launched from the Admiralty slips that Isaac's Bridge opens to give egress to the sea. But the bridge of boats which connects Vasilief's with Apothecaries' Island is frequently thrown open at night, to let vessels ascend to the wharfs.

On the last-named island also, we find that the part next to the Great Neva is that which has been considered most important. There, on its western side, stands a fortress, and a citadel, in the construction of which Peter I. was particularly earnest. These works were originally intended to defend the city towards the north, but they are now surrounded to such an extent with houses and other buildings, that the use of their guns is out of the question. Like the citadels of ancient Greece, they contain the palladium of the state. In the church of Peter and Paul, the richly gilt cupola of which rises above the walls of the fortress, are the tombs of the Tsars, and still more, preserved for the admiration and reverence of posterity, there is the little boat which drew the attention of Peter I. to nautical affairs, and thus became the germ from which ultimately sprung a powerful navy. This fortress is properly called Petersburg, a name which has extended hence apparently to the whole capital. A large portion of the island on the north-eastern side is occupied by gardens; and among these is the Botanical Garden, which, from its original purposes, may possibly have given rise to the present name of the island.

Passing over now to the Viburg side, we see on the

banks of the Great Neva two very large stone buildings, hospitals for the army and navy. Here also is a medical school of great importance for the whole empire, and known as the Viburg Academy. The outskirts of this quarter are occupied chiefly by market gardeners, who preserve in some degree the simple manners of the peasantry. We saw them on holydays amusing themselves with their national dances on the roads. The villas here, as in the other suburbs, are inhabited only during the summer.

Although it cannot be supposed that in St. Petersburg, any more than in other great cities, the character of the people is to be recognised in its original purity, yet it is worth while to inquire, how far the national peculiarities have here maintained themselves against the inroads of foreign fashions and the influence of the court. For the manners and modes of thinking of a capital connected by manifold relations with the rest of the empire must necessarily be felt by the majority in the provinces.

If we were to endeavour to classify the inhabitants of the capital, according to those circumstances of life which are pervading and essential, we certainly should not adopt the official distribution of the population into fifteen classes. The nation in truth falls naturally into a few leading groups, which remind us of the division of organic bodies in natural history, into Artificial Systems and Natural Families. Grouped in this manner, the inhabitants of the capital come under the following heads:—

1. The numerous class of persons engaged in the service of the state, and enjoying, consequently, high privileges, and who, collectively and exclusively, are entitled and bound to wear the state uniform (Mundir).

2. Individuals who enjoy high privileges, not for their own services but owing to their relationship or

connexion with the first class. Considerable estates, and a sort of hereditary nobility, distinguish this class, which is not, however, very numerous.

3. Foreigners, chiefly merchants, who, from a sentiment of hospitality converted into a maxim of state, are treated with more consideration than is strictly due, according to the popular mode of thinking, to their occupations and employments.

4. Russian merchants and handicraftsmen, partly free, partly in servitude.

5. Russians engaged in trades and manual arts, at their own choice and on their own account, or in the service of others, and who have the lowest amount of privilege. These also are either freemen or serfs; but this circumstance is here, as in the case of the fourth class, of little outward value, and is hardly to be detected in the actual relations of life. The clergy do not constitute a particular group, but, according to circumstances, belong either to the official class or to the people, and seem to form a mean between both.

In the modern language of St. Petersburg, one constantly hears a distinction of the greatest importance conveyed in the inquiry which is habitually made respecting individuals of the educated class, Is he a plain coat or a uniform? However one may be surprised and shocked at first at the unusual value thus set on an outward decoration, and at the abrupt line which severs the members of the same community, yet the system grows more comprehensible and less offensive, when we fix our attention on its actual working.

In truth, though the Russian official is sharply and completely separated from the rest of the people by his uniform, yet the aristocracy, thus created, is possibly less odious than that of other countries; for its internal organisation is extremely simple; all who belong to the order are on a perfectly equal footing;

in the privileged class there is no peculiarly favoured caste. Again, within this wide circle of privileged, equals personal ability and agreeableness of manners are duly appreciated. The way in which the interests of the individual are involved with the public service gives rise to an "esprit du corps," and besides, entrance into the most favoured class in the nation seems to be as easy as it is desirable; thus the public servants in Russia form in truth a class of nobility which may be called an order of merit, which has maintained itself in greater purity here than in other states, because Peter I. bestowed the offices and employments, which had formerly been held for personal services to the autocrat, only as rewards for faithful service to the state.

Every kind of public service carries with it some personal immunities, and only a certain advancement in official rank is required, to make them hereditary. Thus for example, the acquisition of landed property and of serfs attached to it is reserved for a certain rank (the 8th of the artificial classes), but as hereditary succession is inseparable from these, there thus arises hereditary nobility. It is remarkable that in society in St. Petersburg, where there is a constant rivalry between the official and hereditary nobles, the former always have the upper hand. Here the love of rank or office is spoken of always as a peculiar and noble passion, while one not actuated by the thirst for honours is described by the word *Nédorosl* (undeveloped), a term applied in old times to those who from immaturity or bodily defect were unfit to bear arms.

The mutual relation of the official and the hereditary ranks in St. Petersburg seems to be very distinctly marked, if it be only admitted that a foreigner here can really get an insight into the social system. But the stranger is sure to feel immediately

the cautious reserve with which the natives converse with him; and he soon discovers that the prompt attention and civility which he experiences in society must be ascribed to the desire to conceal the repugnance felt towards every thing foreign, which it would be inhospitable to avow. Among themselves the Russians of the upper classes are bound together by a feeling of kindred, in consequence of which they never feel quite at ease but in purely national circles.

These peculiarities must not be ascribed to the influence of despotism, nor to any wish to conceal from strangers the backwardness of the country. They originate in a positive homogeneousness of disposition which unites the Russians as one people, and makes them involuntarily shrink from contact with a foreigner as from something heterogeneous. It cannot be doubted that in feeling and moral sentiments, the Russians differ fundamentally from the people of western Europe; and they themselves say that a stranger must *obrusyety*, that is, become *russified*, before he can properly appreciate their national character.

With respect to the intellectual cultivation of the class here referred to, it is impossible to make a general estimate of it, or to describe it in terms universally applicable, for in this very respect are found the widest differences in the same rank of life. Naval officers, civilians engaged in the administration of the state, and philosophers by profession, members of the Academy and other public institutions, all belong to the privileged class, and meet together as equals. It were more to the purpose and more capable of being done briefly, to explain what they understand by social refinement. Here the national circle is characterised by an unusual degree of dexterity in the manifold arts of society; by a correct and practised sense of outward propriety and an ex-

traordinary faculty of quick comprehension, and of lively repartee often combined with great felicity of expression. On this point previous travellers are all agreed, though they differ most unaccountably on many others. They are obviously in the wrong, however, when they ascribe these social gifts to the early influence of French manners. The social refinement of the Russians is altogether of home growth, founded in the moral temperament of the nation, and plainly indicated in the structure of the language.

The excessive eagerness of the Russians for outside creature-comforts; the hankering, which, in common with other nations of eastern origin, they have after show, and the enjoyments of luxury—a disposition which has increased with the wealth of the capital—awaken in individuals keen feelings of self-interest, which encounter with an animosity so much the more deadly, as the restraints imposed by an absolute government prevent a free and open rivalry. Outward self-denial, cloaking under a calm demeanour a spirit racked with jealous passions, is more in requisition here than elsewhere, and finds facilities of concealment in the national manners and the genius of the language.

As to their capabilities for science, it must be allowed that they are gifted with superficial liveliness and the faculty of comprehending readily whatever is well defined, but on the other hand, they are deficient in that fine and deeply-seated sense of truth which alone can give birth to original and continuous research. They have a decided preference for mathematical studies, in which they often succeed. This preponderance of the intellectual faculty over the feelings; the liking for what is positive and definitively settled; and the dislike of doubt which calls for further inquiry, seem to establish a curious reciprocity between the mental character and the religious pro-

fessions of the class under consideration. At all events, here we find in close contact, and not separated by any intermediate shades of opinion, the most orthodox, conscientious adherence to the rites and doctrines of the Greek church and the most uncompromising purely rational infidelity. The numerous religious sects which have sprung up among the people, and which form a medium between those extremes, never extend to the upper classes of society.

The German and other foreign mercantile families, for the most part opulent, who are settled in St. Petersburg, form a portion of the population completely separate from the class just described. They adopt such Russian usages as seem to be either intrinsically advantageous or suitable to their new home, and for the rest cling to the manners and customs of their native country. They acquire as much of the Russian language as is absolutely indispensable, but zealously cultivate their mother-tongue; and indeed the Germans settled in St. Petersburg go so far as to maintain that their language is more correct and pure than that which is generally spoken in Germany. These foreigners can hold lands by a kind of hereditary lease; and this tenure differs from the noble kind only by its not conveying serfs—a distinction which does not lessen its value in European eyes.

These foreigners are sufficiently numerous to form among themselves a good circle of society, which is never visited by Russians. In the eyes of the latter, the foreigners are sinful heretics, whose company is, if possible, to be avoided. To partake of a meal without offering adoration to a crucifix set up in the room for that purpose is considered by Russians of the better class as sinful, or at least as an unbecoming departure from a hallowed custom; while foreigners of the reformed church, on the other

hand, deem it unbecoming to affect conformity in such cases, and so there is a strongly marked line of demarcation drawn between them. Without any reference to the first grounds of the diversity of dispositions and usages, the Russians frequently make use of an ancient adage—

"Where the Russian has his gain
The German finds his bane."

The word here rendered, according to its modern acceptation, by "German" (Nyemetz), meant originally one "dumb," or unable to speak Russian, and was applied to strangers in general.

It still remains for us to pass under review a class of the inhabitants of St. Petersburg, whose national peculiarities have suffered no modification, and who, not being confined like those above described to a particular line of development, seem capable of a culture the limits of which are not to be easily assigned.

Among all nations of Sclavonian descent, the propensity to a wandering life soon showed itself. As their dominions extended, the opportunities of exchanging the produce of distant regions increased, and the scattered rovers gladly united in the prosecution of long trading journeys. In the earliest monuments of Russian history, the influence and importance of the mercantile class are already intimated. A few adventurous foreigners, enticed by the rumoured profitableness of the trade, were the first to seek an acquaintance with the Muscovite empire. The hospitable reception which they met with, and above all, the advantage of finding the various productions of the country all brought together in large fairs, encouraged a closer intercourse. Thus began the connexion between Russia and western Europe.

When we contrast the substantial importance of the mercantile class in Russia with its want of public

estimation and privileges, we can only explain the latter fact by supposing, that the rulers of the empire deemed it unnecessary to foster by any means the most active propensity of the people. The merchants and traders are divided, according to the amount of their property, into three ranks (gildi)—a division, however, which has no essential influence on their intercourse in social life. Any individual not engaged in the public service, and who intends to invest his property in any kind of mercantile undertaking, may have his name inscribed in one of these ranks, and this may be done not only by freemen, but by serfs also, who having acquired some property are able to redeem themselves from personal service by an annual payment in money.

The peculiarity of this class is, that devoting themselves heart and soul to money-making, they regard rank and honours with an almost religious cynicism, in direct opposition to the principles of the class already described. This temper shows itself in their exterior. They are never induced by the example of the foreigners, with whom they mix in the course of business, to lay aside their simple and antiquated costume: with few exceptions they wear long beards, and instead of adopting European clothing, are satisfied with the old-fashioned wide gown or kaftan and a girdle.

This obstinate adherence of the mercantile class to old customs is precisely what they are reproached for by Russian statesmen, who regard it as a proof of the indocility of the people. It is also objected to them that they do not know how to use their wealth. Even the richest among them abstain rigidly from any indulgence which might seem inconsistent with the gravity and simplicity of ancient manners; and these economical maxims are in such perfect harmony with their strict notions of religion, that it is hard to

say which is to be considered as the cause, and which the consequence. Content with maintaining stubbornly their position as an antique element of the nation, the Russian merchants never attempt to vie with the official class, nor to procure for themselves, by means of their wealth, any kind of external distinction or stamp of respectability. They associate only with those of their own order, without much regard to difference of fortune; for as there is nothing to prevent the meanest pedler from rising to be a great merchant, a sentiment of equality pervades the whole trading community.

Even in this class one sees a wonderful aptitude for social intercourse, with a polish in address and demeanour which is never found in Germany among people of like occupation, though they are much better off. A remarkable suavity of carriage and a confiding simplicity always made us feel that there was something extremely attractive in the outward bearing of these Russian merchants. Their mental cultivation goes no further than that they are all *grámmotnie*, acquainted with letters, or *grámmata snágut*, they understand writing. This acquirement, which they owe in general to their own efforts unaided by instruction, enables them to study diligently the sacred writings, which they regard with peculiar reverence. Thus awakened, free from care, and seeing much of the world in the course of business and distant travels, they are almost always inclined to read. But unhappily they find little guidance, and can only ramble at large in their various but unsystematic vernacular literature. A Russian author might render his country the greatest service, and procure for himself an everlasting reputation, by turning to account the desire of knowledge which characterises this class, and presenting them with an encyclopædia of solid instruction adapted to

their tastes. To the activity of their minds must be ascribed the great number of sects which have sprung up among them.

Of all the Russians, the tradespeople alone, unaffected by the state-principle, care to discuss the affairs of their own and of foreign nations. As their knowledge, however, of what is going on abroad is extremely limited, their political speculations are often exceedingly fanciful: they reduce all things to the elements with which they are familiar, and so make all the world Russian. At the same time, they cling so obstinately to the notions which have thus pre-occupied their minds, that their intercourse with foreigners must continue some time before they become fully sensible of their misconceptions. Opposite as the aims and views of the mercantile community are from those of the official class, yet they all equally belong to the national character, and are developed according to circumstances. The tradesman's son, if he enters into the public service, assumes a mode of thinking quite different from that in which he was brought up; and families of the two classes frequently form matrimonial alliances, without allowing the connexion between them to modify in the least their respective sentiments and habits.

The women of the mercantile class in St. Petersburg are easily distinguished by their beauty and purely national physiognomy, to say nothing of their strictly preserved national costume. The old-fashioned popular head-dress is here, as elsewhere, one of the most obvious marks of class. The love of finery among these ladies we had an opportunity of observing, on the occasion of a festival which suits so ill with modern notions of propriety, that we should hardly have expected to find it still celebrated without any qualification in the Russian capital. In conformity with a Sclavonian usage, not wholly in-

operative among the upper classes, and remaining in full vigour among the bulk of the people, marriages are brought about by *Svakhi*, or matchmakers, who are always in a condition to offer proposals to men of their acquaintance. Then follow visits of the men to the proposed ladies, and should acquaintance with them prove unsatisfactory, and the match be broken off, no offence is taken.

But it is more remarkable still that the mercantile class in St. Petersburg have a public festival established for the same purpose. Every year, on the 26th of May, the young women of this class assemble in a particular part of the Summergarden for a formal *Bride-show*, as it is called. Decked with oriental profusion of ornament, the marriageable girls are ranged along the alleys of the garden with some members of their respective families and the matchmakers behind them. The men passing along are at liberty to enter into conversation with any of the girls, and the acquaintance thus commenced often terminates in marriage.

Trade is a much more simple affair in Russia than elsewhere. The merchant there travelling himself, bartering, or paying ready money, dispenses with the correspondence and exchange which are of so much importance in other countries. The import and export trade of St. Petersburg is indeed chiefly in the hands of foreigners, yet considering the great extent of the empire, the way in which the inland trade is carried on is surprisingly simple. This is particularly remarkable in the case of the Russian-American trading Company, the dealings of which extend all over the earth, and of which, nevertheless, the members residing in St. Petersburg adhere steadfastly to the manners and sentiments of their class. Some connexion with this Company is deemed to be of great importance for the purpose of a journey in

Siberia; and while negotiating with it in this view, we learned a few particulars which characterise, in a curious manner, its mode of doing business. Thus, for example, it was thought impracticable to furnish us with bills or money-orders, payable at the Company's factories in the remote parts of Siberia or in America. The trade is carried on so exclusively by way of barter, that even the small sum of money required in our case could not be securely reckoned on. As to the correctness of these representations, it was impossible to doubt it, the parties who made them manifesting in every way the utmost readiness to forward our undertaking. We received letters of recommendation to the members of the Company settled in Siberia—an advantage not by any means rendered needless by the favours of the government, since the mercantile class in the remote parts of the empire keep more to themselves, and maintain their independence better, than in the capital.

Besides, the extension of our journey to the Company's American settlements was admitted to be desirable, as every contribution to the physical or natural history of those regions was calculated to forward the Company's ulterior plans. With this enlightened view of their true interests, the Russian-American Company have formed in St. Petersburg a collection of objects of natural history and of art, brought from the countries intrusted to their control. Stuffed specimens of seals and fur animals of various kinds, as well as of the weapons and traps with which they are killed or taken, and samples of utensils, and skin dresses more or less elaborately worked, here helped to make us acquainted with the productions and the arts of those distant shores.

With respect to the lowest class of the Russian population, the artisans and day labourers, the account of their condition does not belong so much to the

description of the capital as to that of the empire at large. But we may here mention a portion of this class, peculiar to the capital, we mean the *Artélchiki*, or members of a brotherhood, who are chiefly employed as messengers and porters by the wealthy foreign merchants. Where reckonings or tallies are to be kept, these men are always preferred, and receive better pay than is otherwise usual in Russia, on account of their incorruptible honesty. These men, whose only fortune is their labour, are collectively sureties for each member of the fraternity; and this kind of bail has had such an effect, that large sums of money are frequently intrusted to an Artélchiki to make purchases or pay away. Many traces may be found in Russia of a tendency to form similar associations for the sake of improving the credit of a particular business.

Peasant serfs, who wish to earn an independent livelihood in the capital, receive from their masters written permission to leave their native farms or village for a certain time. Should their efforts prosper, they find no difficulty in obtaining prolonged leave of absence, and in this way they often become permanent settlers in St. Petersburg. To this class belong all the drivers of the vehicles for hire in the streets. Their number increases very much in winter, because the wooden sledges used during that season, and which are made by the peasants themselves, are much cheaper and more easily procured than the Dróshki, or elegant spring carriages of summer.* The owners of the latter usually begin business

* Dróshka is the diminutive of Droga, the name of a vehicle now used only in some parts of Siberia, and in which jolting is obviated by choosing for the bars which join the axles and bear the load two very long, yielding and elastic pieces of wood. Drogi sixteen or twenty feet long are common in the mountainous parts of the government of Perm, the moderate steepness of the Uralian mountains permitting the use of these long carriages. The name is derived from *drojiti*, to vibrate.

in the remote quarters of the town, where old and worn-out vehicles are used, and when they have acquired as much as enables them to buy a better description of carriage, they ply in the fashionable streets. There is no fixed rate of payment for them; but the hire depends on the goodness of the carriage; yet competition and usage have so far ascertained it, that attempts to extort are very rarely made except on foreigners.

The boatmen also who ply on the Neva and its arms are peasants who flock to the capital in the summer, and return in winter to their homes, where they usually find some other occupation. The Russian people in general have a wonderful faculty of imitation, and such dexterity in handicraft, that almost every one of them can produce articles which in western Europe are considered as exclusively the work of particular trades. When the slender means of these self-taught artisans are taken into account, the perfection with which they imitate the various and even the most elaborate productions of western Europe is quite astonishing. The fidelity of the imitation, however, is only superficial; and the cheapness of such articles is easily explained from the worthlessness of the material and hasty workmanship. Yet in what may be called indigenous arts, as the working in leather, and the construction of wooden carriages of various kinds, the articles produced by the Russian artisan are as perfect in all respects as they are cheap.

The extremely moderate remuneration with which these people are satisfied for their labour, is explained by the frugal simplicity of their way of living. The boatmen and the drivers sleep even during the cold nights of spring in their wherries and their carts. To make this more easy for the latter, cribs for the horses are set up in the corners of the streets; and during the winter, fires are kindled in some open places

through the town, which render it still practicable to live wholly out of doors.

Their clothing is so strictly in accordance with primitive usage, that not only is it very easily procured, but they can even, many of them, make it themselves. Their food is also of the simplest kind, while at the same time the satisfying of such wants is facilitated here, to the greatest possible extent, for all who are content to abide by the national customs. In the streets of St. Petersburg may be seen at all times a great quantity and variety of articles of food at the lowest possible price. Numerous drinks are prepared from herbs, and besides the usual fermented liquors, one remarks a beverage made from the fruit of the *Vaccinium Oxycoccus*, as well as the ancient mead, poured out to street customers in handsome glasses. These are succeeded in winter by the *Sbitin*, or warm drinks. Nor must we omit to mention *Kvas*, a drink of all seasons in Russia; and which is a thick and (as the name implies) a sour, half-fermented decoction of bruised grain. This drink awakened in me at first the most violent disgust, yet in a few weeks I grew partial to it; the change of taste probably arising from general change of diet.

A want rendered indispensable by usage is that of the vapour bath, the gratification of which nevertheless is brought by the universal demand within the reach of all. Baths of good size, well provided and extremely cheap, are opened in all parts of the town: Sunday evening, in particular, seems to be set apart for this pleasure, and the lower orders may be then seen flocking in families together to the baths. These when heated may be discovered a good way off by the aromatic odour of the soaked birch twigs and leaves which are used in the baths for rubbing the skin.

In order to complete our description of the social condition of the Russian capital, it only remains for

us to say a few words respecting the clergy. We have already remarked that the ministers of religion in Russia do not form a group of the population by any means so separate and distinct as the other classes above mentioned. The individuals who are clothed with the highest ecclesiastical dignities usually mix with the privileged class; while the lower clergy associate with that portion of the population which may be conceived to be represented by the tradespeople. The love of the latter for the study of the Scriptures and for religious knowledge makes them rather partial to the company of the clergy, who possess, however, in general, no more instruction than is absolutely indispensable, and may therefore be considered as entering into the ancient element of the population.

The Russian clergy may be readily distinguished by their mode of wearing their hair and beard, and also by a peculiarity of accent, arising from the familiar use of the old Sclavonian, which is the language of their church and Scriptures. Their long and generally fair hair contrasts disagreeably in a stranger's eyes with their coarse and vulgar looks; so that the sentiment of the ancient Greeks, who thought long hair to befit the dignity and excellence of the priestly office, seems to be not without foundation. In conclusion, it is worthy of remark, that notwithstanding the zeal for religion and for the doctrines of the church manifested everywhere in Russia, the clergy in that country enjoy no personal consideration whatever, and exercise no influence on opinions. In the preceding sketches of character I have been particularly careful to confine myself to outward appearances, which the reader, if he pleases, may analyse, so as to discriminate between the original, essential character of the people, which may perhaps foreshow the course of future history, and the adventitious

tastes and dispositions, which are but the monuments or impressions of past events.

Among the sights of the capital which are most deserving of attention may be mentioned the collections belonging to the Academy of Sciences. These are kept in a building at the southern point of Vasilief's island, and the German name of which, Kunst-Kammer (Cabinet of Art), given it when it was first raised, announces its original destination. When in the time of Peter the Great a lively interest first began to be felt in the various branches of knowledge, it was intended to deposit here whatever objects of art seemed valuable either as memorials or for instruction. Of the collection made with this view there still remain a few curious articles; among others, a large celestial globe, now much injured, purchased by Peter on his travels in western Europe; and also many specimens of turning and of sculpture, arts held by the Tsar in particular estimation—indeed his own productions of this kind were subsequently placed here, perhaps by his command. Among these are some bronze bas-relievos representing, with great perfection of outline, different stages of the battle of Pultava. These are extraordinary monuments of the union in the same individual of the artist's skill and patience, with the soul of the hero and the mind of the reforming autocrat. But still more curious would it be, if there were exhibited some of the more homely productions of imperial industry; for there is a popular tradition, not unworthy of credit, that Peter being struck with the ingenuity shown in the manufacture of lime-bast shoes, such as are worn by the peasants, set to work himself to make them.

It was under Catharine that the museum of the Academy received its present form. Besides its ethnographical treasures, it contains collections of natural

history. Among these, the most worthy of observation is the collection of fossil bones of extinct species of animals. The skeleton of the famous mammoth found by Adams is here to be seen beside a skeleton of the living species of Indian elephant, and the difference between them in the position of the tusks immediately attracts notice. In the mammoth the tusks approach closer together at the roots than in the elephant, and thence extend laterally like two scythes in the same horizontal plane, and not in two parallel, vertical planes, as in the elephant. It would thus appear that the mammoth, in defending itself, moved the head from side to side, whereas the elephant in striking tosses the head upwards. The mammoth is also distinguished from the elephant by the greater length and compression of its skull as well as by its superior height.

A detached piece of the mammoth's skin a few inches in length, with thick wool and long brown hair, is also to be seen here, and a few similar patches still adhere to the bones near the feet; the rest of the hide and hair has been made away with by the keepers of the collection. Here are also large quantities of bones of various other extinct species of elephant, one of which (named by Fischer *Elephas panicus*) seems to have surpassed the mammoth in size as much as the latter exceeded the Indian elephant.

There are also in this collection a great many skulls of the larger kind of antediluvian rhinoceros (*Rhin. teichorhinus*, Pall.), which far exceeded in size any of the living African species. The skull, owing to its great length and the arching of the upper jaw, has some resemblance to that of a bird, and may perhaps have given rise to the fables which now circulate among the Yukagirs on the shores of the icy sea, respecting a colossal bird of old times, the ...es of which are said to be occasionally met with.

The mineralogical collection belonging to the Mining Institute (a school for miners, into which the pupils are received at a very early age) is said to be the most complete of its kind in Russia, and is calculated to give a good idea of the formation of the chains of mountains in northern Asia. Among the other interesting objects contained in it may be mentioned an extremely instructive series of specimens of the alluvial gold found in the Uralian chain. The metalliferous grains vary from the size of a pea to masses of twenty-five pounds weight, yet in all may be remarked a tendency to a spherical, kidney-shaped figure, and in this they agree with the platinum found in the same region. In other parts of the earth the same metals are generally found with a crystalline structure.

Here we saw a block of pure malachite weighing above 4000 pounds, and brought from the district of Yekaterinburg; and also the mass of meteoric iron which was found in the government of Yenisei, and which, after having furnished specimens under the name of "Pallas's native iron" to most of the mineralogical collections in Europe, still exceeds three cubic feet in bulk. The iron of this mass shows no tendency to crystalline structure—a particular which appeared to me more remarkable after I had examined some curious specimens of meteoric iron contained in another collection in St. Petersburg. These were grains from six to eight cubic lines in size, and of a regular octohedral figure, which fell in 1824 in the government of Orenburg, separately inclosed in hail-stones.

Respecting the natural circumstances of St. Petersburg, we must now mention a few particulars. The whole tract south eastwards of the city and about the arms of the river presents a soil impervious to water, and disposed to form bog. In the Viburg quarter the tenacious soil is covered with a thin

layer of sand, on the edges of which burst forth numerous springs. These are the only springs found near the capital. Neither is there a single well here; the surface water stagnates without ever entering the ground, and the water of the Neva, which is luckily very pure, alone serves for every purpose.

Wherever in the neighbourhood of the city the natural vegetation remains undisturbed by man, the white birch predominates decidedly in the woods, and here it arrives at a height and a degree of beauty which it never attains in its solitary sites in Germany. The trees which rank next in frequency—of those which seem to be indigenous—are black poplar, elm, and service. About four miles north-east of the city, on the road to the Finnish colonies of Pérgola and Manilofka, are some dreary pine woods, which recall to mind much more forcibly than those birch trees the general character of the region towards the south-west, and the smaller plants alone bear witness on attentive examination to the difference of climate. Thus the *Alchemilla vulgaris*, the favourite meadow herbage of the Alps, grows here much more luxuriantly than in Germany, and often takes exclusive possession of the ground. It was already in flower on the 8th of June.*

How favourable the climate and soil of St. Petersburg are to the growth of trees may be seen on the islands in the Neva, where the variety of trees and shrubs render the landscape quite charming. Cornel, mountain ash, and alder fill up the intervals between noble birches, elms, limes, poplars, and maples. Beech trees are rare in the vicinity of the city, though occurring at Manilofka. The horse-chestnut is totally absent from the natural woods, and is cultivated as a rarity only in sheltered places in plantations. I saw

* It flowers in Breslau on the 31st of May.

it in the Botanic Garden at St. Petersburg, growing under glass, while at Riga it thrives in the open air. It is not the lower temperature of the soil which here proves fatal to this tree but the intense cold of a few days in winter. A degree of cold, however, quite as intense as that felt at St. Petersburg, occurs occasionally in the most southern parts of Russian Asia, a fact which proves that botanists do not speak very accurately when they say that northern Asia is the native country of the horse-chestnut.* The *Robinia Caragana*, introduced from the south-east, is here planted for hedges, and spreads like an indigenous plant, while in Central Siberia it does not pass north of the 53d parallel, according to Gmelin. Indeed it stops at the sources of the Obi, the Tom, and Yenisei.

The 20th of May seems to be the day when the leaves of the birch here unfold themselves. On the 25th the leaflets of the service were fully developed, the limes being in leaf at the same time and the willows in flower. The flowers of *Syringa vulgaris* and *Robinia Caragana* opened on the 30th.† With

* Linnæus, and after him Persoon, among others, adopt this general descriptive comment: M. Schouw, on the other hand, regards the occurrence of the Æsculus in Siberia as a characteristic which the Flora of that country has in common with that of North America. Sprengel and De Candolle have mentioned, the one Tibet, the other northern India, as being probably the original country of this tree. It is still more remarkable to find the environs of Constantinople pointed out as the place where the horse-chestnut was first found. Busbequius, the ambassador of Ferdinand I. to Soliman, is said to have sent the horse-chestnut in 1557 to Matthioli along with other plants which he found in Chalcedon and Adrianople. Sprengel, Hist. Rei Herbariæ, p. 340.; Haller, Biblioth. Bot. i. p. 360.; although the tree is not mentioned in Sibthorp's Flora Græca.

† Some of our observations on the phenomena of vegetation may be advantageously compared with those made at Breslau the same year by Dr. Göppert. (*Ueber die Wärme-Entwickelung in den Pflanzen*, on the Development of Heat in Plants, &c. Breslau, 1830, p. 240.)

	Breslau.	*St. Petersburg.*
1. Betula alba budded	April 10.	May 20.
2. Sorbus aucuparia budded	April 16.	May 22.
(*Berlin*), April 24.		
(*Dorpat*), May 14.		

respect to the first manifestations of vegetable life, the 25th of May here appears to correspond with the 25th of April at Berlin; but the greater rapidity with which the various phenomena of development succeed one another, as we go northwards, was here very manifest. The ice disappears from the Neva on the 22d of April; in thirty days the birch trees are in leaf, and in seven more the syringa flowers.

During our stay in St. Petersburg, the villa-gardens on the islands and the various shrubberies between them, were all decked with young foliage. The fineness of the season added much, no doubt, to the beauty of the landscape; the charms of which nevertheless lay chiefly in the local details. The clear waters of the Neva winding through the islands, and overshadowed at times with groups of trees, then again issuing forth in brightness, together with the contrast between the waving foliage and the stately, glittering palaces beyond, sufficiently explain the love of rural scenery, so manifest in St. Petersburg, and which seems so remarkable in a northern climate. While the sudden

	Breslau.	*St. Petersburg.*
3. Tilia parvifolia budded	April 25.	May 25.
4. Syringa vulgaris flowered	May 19.	May 30.
5. Robinia frutescens flowered	May 23.	
6. Robinia Caragana flowered		May 30.

Here we see that the budding of the birch takes place at St. Petersburg forty days later than at Breslau, and that the subsequent development proceeds much more rapidly in the north, both with native and acclimatised plants. The budding of the birch is followed by that of the

Mountain ash at Breslau in 6 days, in St. Petersburg in 2 days.		
Lime-tree	15	5
Flowering of the Syringa	39	10
Of Alchemilla vulgaris	51	18

The development of vegetation seems to be three times as rapid at St. Petersburg in May, as at Breslau in April. The difference in time between like phenomena at different places is greater in proportion as the stage of vegetation considered is early. This fact proves how much the phenomena of vegetation depend on the temperature of the air; for two series of phenomena, corresponding so closely in detail, cannot be considered as independent of each other.

awakening of nature from her long winter sleep loudly invites to the enjoyment of the country, the oppressive heat of summer makes the cool umbrageous retreats of the islands absolutely necessary.

The inhabitants of St. Petersburg have a thoughtful custom of resorting to certain places on particular days of the year; on the 26th of May, for example, during the bride-show, the general gathering-place is the summer garden on the Neva. Every holyday has its place of pilgrimage; hence, hardly a day passes without its motley throngs, bent on enjoyment; whose mirthful clamour, suddenly subdued, enhances the stillness of the night, which is hardly recognised as such by foreigners, owing to the light. I often returned home at midnight across the islands from the Botanic Garden where we made our magnetic and astronomical observations, and fully enjoyed the charm of the pure and bright nocturnal sky. Nightingales poured their song from every grove on the islands. The outlines of distant objects were here as visible at midnight as they are at sunset under the 50th parallel, when there is a slight mist in the horizon. A dense stratum of clouds usually covers the heavens soon after midnight, but disappears with the falling of the morning dew. Fishermen catching the salmon as they ascend the stream, may be seen, with fires in the bow of their canoes, engaged between the islands. With this exception no native is enticed abroad by the brightness of the nights, while strangers from southern countries often suffer in St. Petersburg from want of sleep; and to this may probably be attributed in some measure the fever to which those are liable who arrive here in the spring. Deceived by the light, one can hardly believe the thermometer, which, in the last week of May, falls during the night, and near the ground, almost to the freezing point.

Notwithstanding the strong nocturnal radiation, the

atmosphere here soon acquires in the spring a temperature sufficient to stimulate organic life. As early as the 6th of June, I found a bath in the Nevka agreeable and reviving: indeed, the natives had begun bathing some days before; while in Berlin, $7\frac{1}{2}^{\circ}$ further south, the cold bath is hardly tolerable before June. The temperature of the main stream at its surface was, on the 5th of this month, forty-three days after the disappearance of the ice, 9° 4′; in the shallow branches, between the islands, it was probably higher. The current of the Neva has been found by M. Lenz to have, in mid-channel, a rate of only two Parisian feet; near the banks, of 1·3 in a second.*

* The immediate occasion of these measurements was the investigation of certain corrections required for M. Lenz's valuable researches into the temperature of the sea at various depths, made by him during Capt. Kotzebue's expedition in 1823—1826. (See Nouv. Mém. de l'Acad. de St. Petersburg, VI. Ser. tom. i.)

CHAP. III.

PREPARATIONS FOR DEPARTURE.— MODE OF YOKING IN CARRIAGES. —ROAD TO MOSCOW.— IMPERIAL DEMESNES.— SINGULAR CUSTOM AT TOSNA.— PEASANTS' ICE-CELLARS.— NOVGOROD, ITS DECLINE. —RIVER MSTA.— SHOES OF BAST.— SECT OF THE STRIGOLNIKI.— BOULDERS.— FREQUENCY OF OAK.— ELEVATION OF THE VALDAI. —BELL MANUFACTURE.—YEDROVO.—LOG ROADS BEGIN.—CANAL BETWEEN THE VOLGA AND THE NEVA.— VUISHNYI VOLOCHOK.— INTERNAL TRAFFIC BY WATER. — NATIONAL SONGS. — CARAVANS FROM THE UKRAINE. — PECULIARITY OF THE CATTLE. — TORJOK. — LEATHER MANUFACTURE. — CULTIVATION OF CHERRIES. — WINES OF THE DON. — GREAT MONASTERY. — TVER. — IMPROVED LANDSCAPE.

AFTER the arrival of Professor Hansteen, accompanied by Lieutenant Due, in Petersburg, on the 21st of June, the magnetic observations were repeated with his instruments, both at the place above mentioned in the Botanic Gardens, and also for the purpose of detecting local influences, if any existed, at the north end of Vasilief's Island, and in what is called the Smolensko Field. By these repetitions we effected a complete comparison of the instruments, such as might serve for obtaining two independent and available sets of observations, whether we travelled together to the same points or extended our researches into different quarters of the globe.

On the 9th of July were signed the long-wished for passports for our journey. These were what are called patent sheets, one made out for the Norwegian expedition in general; the other in my name, with a view to my separate continuation of the journey. We were surprised at the laconic style of this all-powerful talisman. Aids of another kind, but still of great importance, were the letters which we received from M. Prokofiev, Director of the American trading

Company, to the factories at Nijnei Novgorod, Irkutsk, Yakutsk, and Okhotsk; and letters of introduction from M. Hedenström and Capt. Wrangel to their personal acquaintances in Eastern Siberia.

My instruments were packed in the bottom of the brichka, secured from the effects of jolting by folds of Tatar felt. A stock of gun-flints was provided by the advice of persons well acquainted with Siberia, and also a set of tea things ingeniously made to pack together, for the convenience of travellers. Mattresses, too, were procured, not merely in case we should spend our nights in the open air, but for use, also, within doors; for bed furniture is, in Russia, unknown to the people in general, and, indeed, their language has no name for it. The *tuphyáki*, or mattresses commonly used in St. Petersburg, are borrowed, in name and deed, from the Bashkírs of the southern Uralian Hills. The word *postéla*, which signifies any cloths or furs used in spreading or covering a bed, is derived from the Latin *sterno*. The wooden bedsteads, which are to be found only in the houses of the wealthier inhabitants of cities, are called *Krovàti*, a word evidently not of Sclavonian origin, but formed from the Greek κράβατος.

Our carriage not having been made in St. Petersburg was obliged to be adapted to the usual Russian mode of yoking. The pole was at first allowed to remain, but subsequently its removal became necessary, when the carriage was set to run as a sledge. The Russian mode of putting horses to in carriages, which is adopted almost universally with every kind of vehicle, is quite peculiar, and for going at great speed has manifest advantages. The shafts have a perforation or a ring at one end, which slips on the axle within the wheel. The upper ends of the shafts are then fastened by cords to the extremities of the axles, and are thus drawn outwards, while a strong

wooden bow, bound to them near their upper ends, and standing over the horses' withers, keeps them together, while it lends them elasticity. The extremities of the shafts being bound fast to the horse-collar, which is of wood, elastic and open below, the closing and tying of the collar, an operation which requires both strength and dexterity, completes the yoking. Thus the horse and carriage are joined together tightly, yet without any inconvenient stiffness; every motion of the horse is communicated at once to the carriage, and there are no sudden checks or impulses, such as arise from the tightening or relaxing of the traces, when these are the means of draught.

The reins of the middle or shaft horse pass through rings attached to the wooden bow, which connects the shafts, and are thus kept clear of entanglement. The side horses are yoked, as in Western Europe, with bars and traces; their inner reins being fastened to the shafts, while the outer ones go to the driver's hands. To the description of the Russian manner of yoking horses in carriages, and of the rapid driving usual in St. Petersburg, may be appropriately added some mention of the peculiar cries with which the drivers either incite their horses, or warn pedestrians of their approach. The word *padi*, go along, is rapidly repeated with variety of accent, and then, at regular intervals, is screamed out at the highest pitch of the voice. These shrill cries are matter of fashion; so that either boys, or men distinguished for high pitch and piercing quality of voice, are in general preferred as drivers.

During the last days of our residence in St. Petersburg we were unceasingly followed by long-bearded horse keepers, importuning us to hire their horses for the first portion of our journey; for on account of the great demand for post-horses from the capital

in all directions, the government has renounced, for the adjacent stages, its exclusive right to supply travellers with horses; and so active is the competition among those who engage in the business thus relinquished by the government, that horses may be hired of them on terms far below those of the post. The gratuity looked forward to by the driver or postilion, is here, as throughout Europe in general, named after the popular drink, which is, in this case, tea. "Something for tea" is the common petition of the drivers in St. Petersburg; and, indeed, we observed that in the public houses on Vasilief's Island, the ordinary drink of this class of people is tea. Brandy, monopolised by the crown, is retailed in St. Petersburg, by licensed parties, in shops exclusively devoted to this business; but these places, though much visited, are never, like the tea-houses, the common resort of the lower and middle classes.

On the morning of the 11th of July, we left St. Petersburg on our way to Moscow, and by nine o'clock at night we had travelled over about 90½ versts of good road. During the first third of the journey the proximity of the capital was still recognisable in the cultivation of the land, the hamlets visible at a little distance from the road, and still more in the woods and shrubberies adorning the imperial demesnes of Tsárskoe Selò and Pavlovsk. Further on, beyond Ijora, thick forest prevails on both sides of the road. Pools of water, collected in every open spot, announce the fenny character of the country. Birch and tall pines predominate almost exclusively; fir trees are seen only on dry spots. On the moist margin of the forest grow *Epilobium angustifolium* and *Spiræa Ulmaria*, always together, forming a thick hedge of the height of a man, and extremely luxuriant. This forest differs very decidedly in its character from that on the eastern frontiers of Prussia, towards

Courland, chiefly owing to the retentiveness of the soil. The heat of the day, which in the dry fir forests would have been insupportable, was here tempered by the humid air and the evaporation. Large blocks of granite lay strewed about in such abundance as to supply the material for forming the road.

We were surprised to see some farm-houses and even villages without a field of tillage near them. The hay-harvest, which seemed abundant, was in some places quite finished. Ijora and Tosna are populous villages of boarded log-houses, which look well. On the bridge at Tosna stood women, offering to those who crossed it Kvas, with pieces of ice floating in it, in clean wooden bowls. Here every peasant's dwelling has its ice-cellar. Ice is much more easily kept here than in Berlin, to say nothing of the facility with which it is obtained in winter from the stream flowing through the place. We spent the night in Pomeránya, a village, the inhabitants of which retain no traces of their Finnish descent. Here a German has established an inn; a convenience unknown to the national usages of Russia, and but rarely met with in the further course of our journey.

When we had completed our magnetical observations, we left Pomeránya (July 12.) with post horses. The first part of the journey lay through a flat, marshy, and thickly-wooded country, like that already passed over. At Chúdovo, sixteen miles from Pomeránya, the character of the landscape began to change, and a low range of hills, extending S. S. W. to the lake of Ilmen, now varied the picture. But at Podberéso, which is situate, as the name implies, under a birch wood, the scene completely shifted, and we at length saw an open, undulating country with meadows and corn fields. The inhabitants of Chúdovo and Podberéso are wholly occupied in breeding and keeping horses; the men taking by turns, according to rules established among themselves, the duties of

drivers and carriers. As we entered the latter place on a holyday, we saw the people in their best dresses loitering before their doors. The men wore striped shirts, over white linen trousers, and carried a jacket, always of bright yellow, hanging over their shoulders. They put on the jacket, and bind it close with a girdle, when about to start on a journey; a pair of enormous leathern gloves then completes their equipment as drivers.

As we approached Novgorod, the hills attained a greater elevation, and beyond the old buildings of the town we could see the bright surface of lake Ilmen. Here are ruins of old walls and fortifications, works of the rudest kind. A wooden bridge leads over the broad stream of the Volkhof to the principal quarter of the town, where the towers of some sixty churches and monasteries serve as monuments of bygone importance. The houses, which are for the most part of wood, with carved ornaments, stand scattered among the public buildings, very imperfectly arranged so as to form streets.

We saw in Novgorod a religious procession led by the priests singing; after them came the civil officers of the town, dressed in their uniform, then the bearded merchants and other citizens. We were told that Novgorod had lately lost its importance, the trade having gone to the other side of the lake; where the town of Staraya Rüss, with its brine springs and salt pans, has suddenly risen to distinction. The plain, three or four miles wide, round Novgorod, bears no traces of the buildings and population with which it is said to have been formerly covered. But we must not on this account reject the tradition, for even the wooden houses of the present day are capable of being easily removed so as to leave no trace behind; — but in former times the Russian towns were, as to the dwellings, no better than temporary encampments.

The inhabitants turn to account the extreme fertility of the soil, by cultivating culinary vegetables assiduously. But, with the exception of a few apple trees and blackberries, which latter are here reared in gardens as well as grow wild, we saw no signs of an attempt to produce fruit.

We left Novgorod at two o'clock in the afternoon (July 13.), and at Brónuitzi, twenty-four miles from that place, crossed the Msta; which, in spite of its sluggishness, has a fine appearance, owing to its great width. Its right bank rises to a height of 150 feet above the water, and this degree of elevation continues over an extensive tract. About four miles from Saitsóvsky-Yam (sixty-two versts from Novgorod), where our day's journey terminated, the ground suddenly assumed a bright-red colour, such as is seen in the variegated marl, and the more recent strata of the Keuper sandstone. The surface was at the same time varied with low hills.

On alighting to spend the night at a peasant's house in Saitsóva, we were received with the customary expressions of welcome and hospitality, for the people here never think of deriving gain from the entertainment of travellers. But I saw in this village, as well as in some other places along the road, a cook's shop. Near this kind of establishment, there is ordinarily a baker's shop also, announced by wheaten loaves (Kaláchi) hung up in front: these loaves have a singular shape, resembling a basket with a round handle. The Sclavonian term Kaláchi still remains with little change in Germany, introduced probably by the Vends. In some parts of Brandenburg, loaves not unlike the Russian are now called Kalash. At the entrance of the village, too, we saw ample provision made for another and most pressing want of pedestrians, in a magazine of Labti or bast-shoes. These, though light and flexible, soon wear out; an

inconvenience obviated in some measure by the custom of the country, as shoes may be had at every post station.

The keeping of horses is the chief business of the people of Saitsóva, and they engage most heartily in the lucrative occupation. In order to be always ready for travellers, watch is kept on the road at night by a number of men, who lie on the ground wrapped up in thick cloaks to protect them from the cold. As soon as their practised ears catch the sound of the bell, which is attached to every post conveyance, they start up, and have the horses standing ready by the time the carriage arrives. The smith's trade also, and those of the wheelwright and coachmaker, are much in requisition near the great road. If iron be wanted for any repairs, in general there is but one person in the village possessing a sufficient supply of it, but all the rest are ready and eager to remedy every defect with wood and cordage. "We'll set it right, whatever is the matter," is the cry of a host of sturdy fellows, longing for something to do, and who set to work at once examining the carriage. When they have found a defect, as they are sure to do, they repair it in a manner equally despatchful and effectual. All are busy upon it, and all beg for remuneration. They are satisfied with the merest trifle; but the applicants are so many, that it is customary to parry their demands with a jest, and to promise to pay their sons—most of them being young unmarried men.

Here, as well as in several other villages of the government of Novgorod, we saw old men wearing their hair cut short round the crown of the head, to show their connexion with the old sect of the Strigólniki. In 1375, Karp Strigolnik, a fanatical layman, raised a violent opposition against the clergy, whom he accused of simony and abuse of the rite of

confession. It seems likely that the name Strigólniki was given to him and his followers on account of their mode of wearing the hair; for its accordance in sound with an epithet descriptive of their custom (from *strigù*, I clip; and *góloi*, bald,) can hardly be thought the result of accident. But it may be observed, that the Russians were distinguished by this sort of tonsure long before the introduction of Christianity among them; and the adoption of it by religious sects, subsequent to that event, probably arose in some degree from attachment to old customs. Already in the fourth century, it is related by Priscus, who accompanied an embassy to the court of Attila, that he met with a Greek who, being compelled to live with the Scythians, had adopted all their customs, and "had his hair cut off round the crown of his head."

The reddish colour of the ground observed yesterday continued to-day (July 14.) as far as Kresttsui, thirty-one versts beyond Saitsóva. The coloured, marly strata seemed to rest on a black deposit, probably coal. Large blocks of granite lay along the road-side, brought "out of the wood," as the people informed us. As the country here is level and covered with uninterrupted forest, this statement plainly indicates the wide and general extension of boulders from the north. Near Kresttsui, oaks suddenly make their appearance in the woods, mixed with birch, ash, and black poplar. The road rises perceptibly towards Valdài, and here one sees plainly confirmed the observation often made in temperate climates, that the northern and north-western aspects are most favourable to the growth of trees, for the oaks grew more numerous, and the foliage in general exhibited more vigour, the nearer we approached to the summit of the ridge of Valdài.* Wild doves appear to be

* A remarkable example of this occurs at Wernigerode on the Hartz, where on the northern side of the mountain walnut and chestnut trees

numerous here in the woods, and approach the road without shyness.

Valdài, which we reached at seven in the evening, stands in a narrow, open plain on the crest of the ridge. The lake lies towards the N. E., about eighty feet lower than the houses. Granite blocks of considerable size are strewed over the surface of the ridge, which seems to be itself formed wholly of loose drift and gravel deposited by a recent flood on the northern slope of the original ridge. The inhabitants of the place knew nothing of rock in a continuous mass, nor were they acquainted even with its name (Skalùi). The limestone which they use, is found, as they assured us, only in small, loose fragments. Apples, with some other fruits and vegetables, thrive better in Valdài than in Novgorod; and yet, if we may trust a single observation with the barometer, the former place stands at the height of 1220 feet above the sea.

The inhabitants of Valdài came originally from southern Russia, and are distinguished for their vivacity. In conformity with an old custom, we were received by a number of women, who offer cakes, strung together on a thread, to those newly arrived; and, having sold some, allow the strangers, by way of closing the bargain, to kiss them. But, whether from accident or design, this ceremony was performed in our case by the oldest and ugliest of the female population. The prevailing sect is that of the Starovyértzi, or adherents of the old belief, and many of their secular usages had doubtless at first a religious meaning. Thus, the cakes above alluded to are called *lambs*, probably in reference to the Easter cake, which is called the Paschal lamb. The antiquity in Russia of the

bear fruit at a mean temperature which would be hardly sufficient for their continuance in other situations. The true explanation of this phenomenon is, that the vegetation under a northern aspect is so much retarded as to be secured from the danger of night frosts in spring.

custom of giving bread particular shapes and names, is proved by Herberstein's narrative; for he tells us, that at the court of the Tsar in Moscow, there were distributed among the people cakes shaped like a yoke, in order to remind those who ate them of their servile condition. Valdài has been long famed throughout Russia for the brass bells made there, and which are used by the post drivers. The ordinary price of one of these bells is five roobles, but some of finer tone and containing silver, cost at least five times as much. This is not here made a special branch of industry, but every inhabitant who can afford to build a furnace and workshop behind his house casts bells after his own fashion.

(July 15.) At Yedrόvo, fourteen miles from Valdài, the thick woods disappear, and the country sinks suddenly, the plain being now strewed with fragments of white limestone. At the foot of the declivity, which has a depth perhaps of 200 feet, is a small lake, and near it several springs, one of which had a temperature of only 2°·5 R.; whereas the springs at Valdái were from 4°·5 to 4°·75. It cannot be doubted that the water was in this instance protected from the solar heat by the marshy character of the ground at the foot of the limestone ridge. The efficacy of a covering of bog, as a non-conductor of heat, in preventing the melting of ice, is well known; and indeed the people here are thus enabled to keep ice in cellars of very moderate depth.

It is remarkable that stone pavements are here superseded for a long distance by log-roads, formed by laying the trunks of trees together in the direction of the road, and covering these with the branches laid crosswise. It is probable that in former times, these wooden roads were the only kind known to the Russians, even in cities, and indeed vestiges of wooden footways still remain in St. Petersburg; yet a stone

pavement having been once adopted on the most important road in the empire, we can hardly suppose that it would have been interrupted here by the old-fashioned log-road, if it were not that the granite boulders are much less numerous on the south side of the Valdài ridge. In order to smooth these log-roads a little for horses and carriages, it is usual to strew them in summer with boughs and leaves. In winter the snow fills up every cavity and brings all to a level. It is worthy of remark, that the nettle here takes place of the Epilobium and Spiræa, which have hitherto predominated, and forms an impenetrable thicket between the road and the adjoining wood.

Near Khatílovo, thirty-six versts from Yedróvo, may be seen on the roadside the stones which mark the bounds of the governments of Novgorod and Tver. Thirty versts further we arrived at Vuishnyi Volochòk, where we spent the night. Volochòk is the diminutive of Vólok, a *portage* or place where boats or their loading, as the case may be, are carried over land, from one navigable stream to another. At this Vuishnyi, or *highest* portage, a connexion has always existed between the ordinary routes of commerce, leading on the one side to the Caspian Sea, on the other to the Baltic. The rivers Tverza and Msta, both broad and navigable streams, the former descending to the Volga, the latter joining the Neva, are here separated by a narrow tract of moderate elevation.

This communication, the advantages of which for trade appear to have been recognised at a very early age, was rendered more complete by Peter I., who had a canal cut across the portage. The return from the Baltic to the Caspian is unfortunately prevented by the rapids of the Msta below Brónitzui; but from the Volga, which is popularly called, and not without reason, the nursing mother of the empire, from 4000

to 6000 well-laden barges go annually by the canal and the Msta to St. Petersburg. A large number of these carry flour, covered with bast-mats, for the northern provinces. But leather, iron, and the other products of the Uralian mines and manufactories, also reach the capital by the same course. The inhabitants of Vuishnyi Volochók are great gainers by this navigation. They supply horses to draw the boats through the canal. They also build the flat-bottomed barges of small draught, which here take the place of the larger and more perfectly constructed boats of the Volga. Those which descend the Msta are broken up and sold as timber, and in the same way large supplies of timber for ship-building are floated from the forests of Kasàn to the Baltic.

The little town, of wooden houses, seemed well peopled, and full of life and activity; this was indeed partly owing to the influx of labourers which takes place here every summer when the navigation is open. In the evening we saw before every door a crowd of young men and women, amusing themselves with their very peculiar national songs. One can hardly help supposing that a large proportion of the national melodies of Russia were intended to illustrate the easy transition from the pathetic to the ridiculous. Stanzas of the most melancholy character are delivered with a natural expression, when, on a sudden, the chorus repeats the last words in shrill and prolonged piping notes. The individuals most exercised in this mode of singing the burden continue the note till they are just exhausted, and then, slapping their throats, affect to compel fresh vocal efforts. This is received with laughter by the hearers, though the song itself was grave and seriously delivered. There is no parody of the words in this case, but by voice and manner alone the singers contrive to go at once from passion and feeling to mere drollery. This mode of singing a burden, is commonly described by

a term which signifies "to draw out" or prolong. But, on the other hand, the expression "a drawn-out song" invariably means one of tragic contents; so that it would appear as if in the popular mind here, irony and parody were inseparable from the serious lyric.

There is something in this kind of singing extremely characteristic of the Russian people; for one sees among them, in every turn of life, a systematic tendency to hurry from a mood bordering on despair to thoughtless merriment. A certain mockery of feeling and inert resignation to fate abridge the reign of the passions and weaken their influence. It is not improbable that this peculiarity of temperament may have had something to do with the revolutions which have reduced the lower orders of the Russians to their present debased and servile condition.

The road from Volochòk to Torjok (July 16.) led over a perfectly level country with tillage and corn fields here and there, or else dry ground and heavy forests of fir. On the dry soil in the woods we saw fragments of a quartz resembling hornstone, and bearing impressions of corals, star-fish, and sea-urchins. In proportion as boulders of the older rocks cease to present themselves, the more frequently do the comparatively recent geognostical formations appear at no great distance from their original positions.

The road was much enlivened to-day by caravans on their way from the Ukraine to St. Petersburg. Men on horseback, with long poles like pikes, drove before them immense herds of horned cattle. With every train were several vehicles drawn by oxen; either kibitkas, in which the owners of the herds travelled, or open tilegues, laden with the wines of the Don and the productions of Southern Russia. On the front of the kibitkas we saw always a small carved wooden image with a bunch of a dry woolly plant (looking from a little distance like *Rhus cotinus*) tied

before it. The followers of the caravans, of whom we made inquiries respecting this custom, represented it only as the common mode of ornamenting carriages. Yet it is probably founded on some ancient superstition, for among the Russians and their neighbours may be found traces of many strange opinions with respect to plants. Thus, the *Cytisus hirsutus* is always named in the popular songs as a plant of bad omen, which grows on places stained with murder. The Finnish tribes in general have an almost religious respect for rose-trees; while the Lithuanians look upon the elder bush as the dwelling and the altar of one of their chief deities.

The cattle of the Ukraine seemed to be distinguished by the constancy of their fallow-grey colour and their jet-black horns. On the skirts of the woods in the level country gone over to-day hares were very numerous. We were assured that in winter their fur is perfectly white, but at present they were darker than is usual in Germany.

At Torjok, where we arrived at eight o'clock in the evening, we lodged in the house of one who had grown rich by manufacture. The inhabitants of this town are all engaged in making various articles of Russia leather, which they either embroider with gold and silver, or unite in patterns of different colours. These productions have lately become an article of the Russian export trade. The Russians learned this art from the Tatars, whom they soon surpassed, and the name "Kasan boots," now usually given to the boots and shoes made in Torjok, points to a Tatar origin; for among the Russians, Kasan was originally the land of the Tatars; and the learned men of Western Europe too often give the name of Tatars erroneously to tribes who had no connexion with Kasan. The leather used in this manufacture is not prepared here, but is brought from the capital.

There was one luxury here which surprised us, from its contrast with the geographical position of the place. Ripe cherries of a superior kind were carried about for sale in the neighbourhood of the town, at a very low price. These were not forced nor sheltered with glass at any season, but owed their perfection to the peculiar choice of the ground in which they were planted. Cherry trees are here planted, not on level ground, but in gullies or deep hollows, sometimes purposely dug for them. These are called, in the dialect of the place, *grúnti*. The peculiar advantage of this mode of proceeding appears to consist in the protection of the plant from cold winds; great pains are taken also to dress the surface of the grúnti so as to make the ground capable of retaining heat. It was already remarked by Herberstein, (at the beginning of the sixteenth century, when the use of hotbeds was not yet generally known in Germany,) that in Russia the growth of melons was wonderfully promoted by skilfully manuring and loosening the soil. The effects of this kind of care are exhibited, though in a less degree, in the case of the cherry trees, which, in the little, artificial glens (grúnti) escape the keen frosts of winter and of spring.

From Torjok to Tver (July 17.), the road went over a level tract, which became more dry and sandy the nearer we approached the Volga. The sandy spots were occupied by woods of fir, while in the green fields watered by rivulets grew pines. On one of these rivulets lies Miédnoi Yam, or Copper Village, so called from the copper roof of its church.

In the post-house at this place we were treated with some wine of the Don, procured the day before from one of the caravans that passed by. It resembled sparkling Champagne, and appeared to us nowise inferior to the wine made of French grapes. We were told that the wines of Southern Russia

were for a long time thought incapable of bearing carriage, until at last a wine-grower from Champagne, named Winzer, introduced the mode of preparation which is now adopted, and thereby gave rise to another of those remarkable contrasts which result from the connexion between Northern and Southern Russia. The Don wine is sold in St. Petersburg at one third of the price of genuine Champagne.

Close to Miédnoi Yam stand three very old oaks. These are evidently the remains of a forest of noble kind, since the extirpation of which the country has become so dry as to be capable at present of supporting only a few firs; the scanty remnants of this earlier vegetation suffice merely to show that, in respect to temperature, this region (in lat. 56° 9′) is far more favourable to the growth of oak than that of St. Petersburg, although elevated five or six hundred feet above the level of the sea.

A few miles from Miédnoi we left the high road, in order to get a sight of a large and very celebrated monastery. We found its handsome stone buildings concealed in the midst of a dreary fir forest, so that they well deserved to be called "the dwelling in the desert" (Pustúinya), the name here given ordinarily to all convents. The chief edifice is surrounded by a court, which is again enclosed by a high wall with battlements. At every angle of this outward enclosure is a lofty tower, which serves, we were assured, as a prison for the monks who offend against the strict discipline of the place. In the court are several tombstones, one of them shaded by an ash tree of great height and beauty. This monastery looks externally much more like a fortress than a place devoted to purposes of religion. The unusual size and careful execution of this edifice, taken in connexion with the well-known dislike of the Russians to stone buildings, show what sacrifices the people

were obliged to make when Christianity first established its ascendency among them. The outer gate was opened to us by the steward. The great courts seemed wholly desolate, yet we were told that the central buildings were inhabited by "the holy fathers," and that travellers would find in them every accommodation. We preferred, however, the rapid continuation of the journey to Tver to an acquaintance with the inmates of the convent.

The couriers whom we had to do with in the government of Tver were all tall and slender, and of cheerful dispositions. They are said to have come originally from Little Russia. The banks of the Tverza, which we touched upon several times to-day, are formed of sandy slopes, from forty to sixty feet high; but the narrow slip of land between that river and the Volga is low and dry, strewed over abundantly with the rolled pebbles of quartz already spoken of. At Tver the Volga flows very slowly; we found it also comparatively narrow, but the banks bore traces of a recent fall of its waters; this was attributed, by the inhabitants of the place, to the great heat of the weather.

Tver (66¼ versts from Torjok) has the stamp of a town planned and built by government, with churches and public edifices of stone; the private houses, with scarcely an exception, being of wood. The boarded outsides of the latter are painted. Wooden footways run along the houses, and outside of them stand rows of lime trees. On the Volga near the town, lay a great many barges, laden for the voyage down the river. They have no sails, but are towed along the bank.

We travelled to-day (July 18.) from Tver to Klin, eighty-two versts. During the first half of our journey, the road went over a sandy soil, never above a mile from the Volga; but in proportion as we increased

our distance from the river, the country gradually rising assumed a more pleasing appearance, and cultivation became more frequent. This change was particularly manifest at the Shókha, on the bounds of the governments of Tver and Moscow.

Klin, too, is prettily situate on the river Sestrya, which flows through the town with a far more lively course than any of the rivers which we have as yet seen can boast of. The hills, too, which rise S.E. of the town, and are partly clothed with wood, partly bared for tillage, add to the unusual variety of the landscape. In the post-house at Klin is a wareroom well supplied with the productions of the steel works at Tula. The price of these articles, compared with what is usual in Western Europe, is wonderfully low, which is probably to be ascribed to the low wages of the workman. There is no want of very handsome productions. Besides inlaying steel with gold and silver, the workmen of Tula have learned to imitate the famed blank weapons of the Circassians. Yet their work is sometimes careful only on the surface, and their guns require to be strictly examined before they are made use of.

The agreeable aspect of the country which began as soon as we had crossed the Volga, continued during our journey to-day (July 19.) from Klin to Moscow (82 versts). For the first time since we left St. Petersburg we saw well-built country houses with signs of opulence between the grouped dwellings of the peasantry. The people here are not, in general, serfs on private estates, but in the capacity of *Yaemshchiks*, posting-masters or couriers, they discharge immediately to the state the service required of them.

CHAP. IV.

MOSCOW, ITS COLOSSAL CHARACTER.— FREQUENT CONFLAGRATIONS. — THE KREMLIN. — OLD PALACE OF THE TSARS. — THE GREAT BELL. — CHINESE TOWN. — PECULIAR KIND OF INDUSTRY. — SERF MARKET. — MANNERS OF THE GRANDEES — THEIR AMUSEMENTS. — ROAD FROM MOSCOW TO BOGORODSK. — FIRST APPEARANCE OF ROCK. — PLATOVA. — PAINTINGS IN POKROF. — VLADIMIR, SIGNS OF ITS ANCIENT GREATNESS. — MUROM. — TRADE ON THE OKA. — HIVES IN THE TREES. — DOSKINO. — NIJNEI NOVGOROD.

Moscow (where we remained from the 20th to the 28th of July) is quite as colossal as St. Petersburg, but altogether far more various. The nature of the ground it stands on contributes to this; for hills, branching from the elevated stony region on the E. and S. E., rise from the low marshy tract comprised between the Néglina and Yânsa, streams which here join the Moskva. Thus appropriate sites may be chosen for every kind of building: but, on the other hand, it seems to have been mere chance which fixed in this spot the centre of the empire, for we find here no navigable river nor portage, nor any other circumstance calculated to bring together the great lines of internal communication.

Originally the fortified citadel stood on one of the hills, while the grandees occupied, with their palaces and gardens, the heights adjoining it on the east. The tradespeople and labouring classes settled on the marshy flats below; but revolutions and devastation have done much more towards giving the place an air of variety than its original diversity of feature. St. Petersburg might aptly assume for its typical device, a Minerva just sprung in full armour from her parent's head; but that of Moscow should be the phœnix rising unchanged from her ashes.

Western Europe is well acquainted with that fire of Moscow which formed so important an epoch in the history of Napoleon, but the buildings of the city furnish proofs of many and far more momentous catastrophes. Most of the stone churches have survived, without injury, the last conflagration, while on their towers the Mohammedan crescent rises above the cross, a monument of earlier revolutions. The yoke of the Tatars was so lasting and oppressive, that later events of a similar kind seem comparatively unimportant; and even the French invasion is here thought little of, being usually compared with the irruptions of the Pechenegues, and those of the Poles in later times, but never set on a level with the Tatar domination.

In truth, conflagrations were common occurrences in the history of the city; and although much information has been lost respecting the earlier periods, yet there are on record, from the thirteenth century to the beginning of the nineteenth, not fewer than seven total destructions by fire, the most of them the work of victorious enemies. Hence it may be easily understood why the national historians regard the last conflagration of the capital not as the critical event of a remarkable campaign, but as an incidental affair of subordinate consequence.

From the balconies of the lofty houses in Byéloi Górod, that is, properly, the White Town, one has a view of the very streets which suffered most from the fire; but there exists no longer any trace of such a calamity; the whole scene seems to smile with the sense of comfort and prosperity: the well-built houses justify fully the epithet *Bielokámenaya*, or "of white stone," which, properly belonging to some parts of the city, but poetically extended to the whole, is always given to Moscow in the popular songs.

The roofs, covered with sheet iron, are painted

green; and, from a distance, completely disappear among the groups of tall trees, which rise from the gardens. The gilt cupolas of countless towers glitter off the green background. The low wooden houses which formerly encircled all the gardens, scattered among the stone buildings, are now much decreased in number. At present they are to be seen chiefly in the suburbs, which either seem to stretch to the horizon, or else are concealed in thick birch woods. At the time of the French invasion these woods were cut down in the immediate vicinity of the city, but they have grown again with extraordinary rapidity. We have often observed, at Moscow, birch trees hewn for fencing, yet still alive in the horizontal position, and throwing out shoots. The great distinction of the unvaried vegetable nature in this region is its tenacity of life; and, singular enough, the same capability of existing under oppression, and of withstanding stubbornly every revolutionising influence, is here the characteristic of man also. The ear of the stranger is sure, at every turn of conversation, to catch the sounds "kak ni bud" (no matter how), with which the Russians are used to give expression to their habitual indifference and renunciation of all care.

It is a consequence of this peculiarity of the national character that the Russian of the lower classes can live on mere offal and refuse, and on these terms can give his services to another, who, in like manner, expending little save on appearances, acquires merely to gratify the insatiable desire of acquiring. Notwithstanding the great variety of condition, which, under these circumstances, the population exhibits, every thing has the stamp of nationality, and an obstinate adherence to established usage may be plainly recognised as a fundamental principle. Some foreign customs, indeed, are adopted from strangers residing

in Moscow, but they are, at the same time, so changed as to be assimilated to the national manners. Russian nationality may be compared to a river which receives other streams without changing its name; or still better, to a living organism, which, while devouring every variety of food, continues still the same.

Among the chief features of Moscow, the Kremlin is still the most remarkable. In sense and etymology this name is perfectly represented by the word "fort;" it is of true Sclavonian derivation; and not, as has been said, Tataric. The walls which encircle the Kremlin are approached from the W. and N. W., through the new and well-built streets of Kitáigorod. Watch-towers, with battlements, stand at every angle of the wall, which is entered through a dark vaulted covered way, named "the Saviour's Gate." In this passage is a miraculous image, which the great majority of believers regard with the profoundest reverence; others would take it to be the figure of a sentinel armed with the ancient halbert. The greatest care is taken not to allow dogs to enter by this gate; and here again we have a proof that, from the religious point of view, the Russians look on this animal as unclean.

On the S. and S. E. the hill extends to the cliff, at the foot of which the Moskva and Neglina unite their waters. The extensive area within the walls is confusedly strewed over with churches and monasteries, military works, and the ancient palace. The ecclesiastical buildings are still inhabited by the metropolitan and some others of the clergy; the synods, also, are held in them; but the palace of the Tsars, an immense labyrinth of shapeless buildings, is wholly desolate and forsaken. These look like monuments of the earliest times, and their very rudeness makes us wonder at their age. Masterpieces

of architecture are but fair copies of the ever enduring laws of beauty, and never look so old as inferior works, though the latter be comparatively recent. In the middle of the court still remains the tribune or stand from which, when the Tsars resided here, the benediction was annually given to the people: it is as rude and simple as if intended only for temporary use, yet has the appearance of great age. Near it lie five colossal guns, which are oddly covered with stone arches, and seem more likely to inspire false confidence than to afford protection. Once a year only, at Easter, the Kremlin is full of life, and these guns serve to announce to the admiring people the precise moment when the festival begins.

Great castings, meant rather for show than use, seem to have been from the earliest times very much to the taste of the Russians. Close to the large guns lies the still greater bell, in a hole in the ground at the foot of the Ivan Tower. As this is probably the largest metal casting in existence, it seems worthy of remark that Herodotus (460 B. C.) saw with the Scythians, between the Dniepr and Kuban, what was at that time no less wonderful as a work of art. It was a metal vessel, which, from the thickness and the cubic contents assigned to it by the historian, who says nothing of its shape, may be computed at a medium to have weighed 41,000 French pounds, supposing it to have been bronze. This Scythian vessel, Herodotus adds, was six times as large as the largest similar vessel in Greece. Even at the present day such a work would be thought remarkable, for the largest bell in France (that of Rouen), weighs but 36,000 lbs. It is only in comparison with the bell of the Kremlin, that the vessel of Exampe appears insignificant, for the former weighs between 300,000 and 400,000 lbs., or about ten times the weight of the Scythian vessel. This colossal work is 21·3 feet high

with 22·5 feet diameter where widest; it is nowhere less than six inches thick, but has a thickness of nearly two feet at its lower edge.

Herodotus informs us that Ariantas, King of the Scythians, collected the metal for the vessel at Exampe, by a tax imposed on the whole nation, every man being obliged, on pain of death, to bring in a spear-head: he adds, that the object of this was to learn the numbers of the people. Now it is remarkable that similar contributions for public purposes are of frequent occurrence in the history of Russia, under the name of offerings; and there exists, moreover, a very likely tradition, that to cast the bell of the Ivan Tower, vessels, arms, and implements of various kinds were collected throughout the kingdom. So we have here a new example of the surprising steadfastness with which national manners and usages are preserved in Russia.

Bells, as well as every thing else connected in the remotest degree with ecclesiastical purposes, are held in great respect by the Russian people; but that of the Kremlin at Moscow is commended to especial veneration by the name of "the eternal bell," and the end is so far gained that the origin of the work is already veiled in obscurity. Travellers, in the beginning of the eighteenth century, would hardly have passed in silence over this remarkable specimen of art, if there were not some foundation for the statement that it was cast in the reign of the Empress Anna, about 1730. There are other circumstances which give probability to this date. Previous to that time the copper coinage of Russia was issued at so low a nominal value that it was exported in large quantities, a debased silver money being introduced in its stead. In taking measures to obviate this evil, the copper coinage was called in, under Anna, and by the advice of Golovkin and Münnich, a large

amount of it was permanently withdrawn from circulation, and, for the first time in Russia, replaced with paper money. It is far from improbable, then, that the copper thus withdrawn from circulation was melted down and devoted to a pious purpose, in order to reconcile the people to the novelty of paper money.

Calculated from the present price of copper, the mass of metal in "the eternal bell" must be worth about two millions of roobles, without regard to the nobler metals superadded. As this sum formed a considerable portion of the whole amount of the circulating medium at that time, it is hard to conceive what motives besides those above mentioned could have induced such a sacrifice.

As to the tradition so much contested, that the great bell fell from the Ivan Tower into its present subterranean hiding-place, there seems to be no ground for denying the generally received account. From the edge which is buried in the ground, a large piece is broken off, just as would have happened from such a fall, and it may well be supposed that so heavy a body falling from a great height would make a deep impression in the earth. The soil in this spot is of a particularly yielding nature, and it is remarked that the bell sinks deeper every year. What must have been its effect, then, when it fell with great velocity? A part of the edifice in which the bell is supposed to have been suspended, was destroyed by fire in 1737, and it may well be conceived that the rubbish then accumulated, as well as the attempts to clear it out, had the effect of deepening the hollow in which the great bell had originally lodged itself.

A superior dexterity in casting metals, traditionally preserved in this part of the earth from the earliest times, is proved by the bells now hanging in the tower of Ivan Velíkoi, and which were made soon after the erection of the church in 1600. The largest

of these weighs 4000 poods, or 133,684 French pounds; it is consequently five times as heavy as the famous bell of Erfurt (said by Kircher to weigh 25,400 lbs.), and four times as heavy as that of Rouen. Perhaps the great antiquity of similar productions in China, where a bell of 120,000 lbs. was cast in 1403, under the Emperor Yum-Lo, may help to explain the skill of the Scythians and their successors, the Russians. * In proportion as Russia has become associated with Europe, it has been estranged from Southern Asia, with which it once maintained the closest intercourse. The mines of Siberia were wrought from the earliest ages, and doubtless supplied Russia with the metals in the way of trade. The accumulation of the metals was the object which the Russian ruler had in view when, in the sixteenth century, he strictly forbade his subjects to pay foreign merchants for their goods in any thing but furs.

The great city, with its environs in the background and the river at the foot of the hill, alone lends a charm to the view from the top of the Ivan Tower; the buildings of the Kremlin are too uncouth and confused to add to the beauty of the picture. Even their occasional magnitude remains without effect, from want of unity of plan. While Moscow equals St. Petersburg in the elegance of its streets, it is much inferior in its public buildings. The Russians themselves, however, do not think so. They look on the churches of Moscow, and particularly those of the Kremlin, with a veneration, which no artistic perfection could increase. On the evening of Easter Sunday a death-like silence reigns in the streets, till on a sudden, at midnight, the thunders of the great cannon at the Kremlin and the bells of 250 churches, give the signal. The streets and

* A full history and description of this work of art may be found in Athan. Kircher's China Illustrata.

church towers are then all illuminated, and a dense throng of 400,000 people seems inspired with but one thought and feeling. The vagaries of the fanatical portion of them need not be here described; but with mutual felicitations and embraces all repeat the words "Christ is risen," and all evince joy at the glad tidings. Children are accustomed from the tenderest age to share in the emotions of these nocturnal festivals, and they feel to the end of their lives the force of the early impression.

During the week after Easter, the people are edified with a sight of the sacred paraphernalia kept in the Kremlin. They gaze with devout admiration at the numerous articles of priests' attire; at the holy oil, and at the relics of the saints. The feast of the Jordan, also, or the benediction of the river, furnishes them with a spectacle four times a year, when "the secret gate" opens a passage from the Kremlin to the Moskva.

The mercantile portion of the city is no less peculiar than the Kremlin. The quarter in which the retail business is carried on is called Kitáigorod, or Chinese Town, a name which it obtained in the earliest times as the seat of the Chinese trade. At present it contains two Gostínie dvorì, or bazaars, resembling that of St. Petersburg in arrangement, but far surpassing it in variety and amount of business. One can hardly think of a desirable object, for the sale of which a row of stalls is not to be found here. Each dealer both buys and sells in his own line of business. Specie also is here ranked among the articles of commerce. The current coins of all countries are to be purchased, as well as those which time or other circumstances have converted into mere articles of curiosity.

It needs hardly to be mentioned, that the mercantile population of Moscow cling to the same

antique habits which distinguish their brethren in St. Petersburg. Indeed, nationality is much more developed in the former place. St. Petersburg is a chameleon, the colour of which changes from contrast. The foreigner thinks it Russian, while to the native of Moscow it seems a foreign city. The comfortable tradesmen in Moscow have a quarter to themselves, and while their servants keep the shops, the bearded owners chat with one another in the street. They live in indolent resignation on what fortune sends them, and their language is proverbially that of careless indifference.

This kind of life is within the reach of serfs as well as freemen. Among the various expressions used in Russia to denote the servile condition, the most direct is the least offensive. The question, "Whose art thou?" never hurts the feelings, and is answered with, either, "I am my own," or, as the case may be, with the name of another. But the appellation *rab*, which, considered in its etymology, signifies merely a labourer, is thought degrading and an insult. Leisure is here deemed the greatest good, besides or without which liberty has nothing valuable to bestow. Business is commenced with little outlay in the rag-market, which ordinarily bears the opprobrious name occasionally given to that in St. Petersburg (see p. 40). But speculations in the way of gardening or farming, or contracts for work to be executed, are particularly to the taste of the more industrious of the lower orders. The manifold engagements thus entered into on terms of reciprocal advantage are all called by one name, *podriádi*. The podriáchiki are capable, by combination, of executing great works. The richer of them in Moscow will undertake to work quarries in Southern Russia, or to carry wine from the Don.

As this kind of industry passes over insensibly into

the operations of trade, the civic guilds or trade unions are constantly receiving reinforcements from the peasant class. The change thus effected in the peasant's lot takes place the more readily, as it redounds to the interest of his lord or owner, for the tribute or dues of the artisan are much better paid than those of the rural labourer who has no interest in his work. Though this constant defection from the class of rural peasantry is not sufficient to work the abrogation of predial slavery, yet it has that tendency: it lessens the value of the estate and adds to the wealth of the lower orders.

Although the occasional independent prosperity of those born serfs exhibits a germ which may grow till it completely revolutionizes the social condition of Russia, yet the old state of things is still firmly maintained in Moscow. In the Krásnaya Plóshchad, or Red Market, near the bazaar, may be commonly seen a string of men and women sent there by their masters to be hired or sold. These are serfs who, from want of industry, have become an incumbrance to their owners.

But the Krásnaya Plóshchad must not be supposed to resemble a Brazilian slave market. The serfs sent to market for sale or hire are not accompanied by a guard or keeper: the care of improving their mode of existence is left wholly to themselves. Yet neither by this means nor by advertisements do they often change owners, for those who are privileged to possess serfs have usually more of them than they require. Russians of the trading class, on the other hand, as well as foreigners, can have servants only by hire; and the people naturally prefer to be in the service of those who are not privileged masters.

Although the grandees of Moscow think a country seat in summer indispensable, yet the city did not appear while we were there to have lost any of its

activity. The country seats bear the singular name of Podmoskovuyi, or Moscow Appurtenances, because the habitations twenty-five miles round the city are considered as belonging to it. The great number of horses kept here abridges distance, and many who spend the day at a distant country seat enjoy at night the pleasures of the city.

In direct opposition to the feeling which prevails in St. Petersburg, no one here courts office. Nothing is thought so respectable as the enjoyment of the ease which flows from the possession of land and people. The nobility of Moscow who cling pertinaciously to these tenets are a confederation of families belonging, from language and religion, to the Russian nation, but forming rather a collateral dependency than a substantive part of the Russian state. It is only when the movements of the political world seem to threaten their favourite system that they awaken from their dreams of pleasure and throw aside for a moment their indifference. They think of nothing but diversion. From splendid balls and concerts to bear-baiting and bear-fights they have every kind of amusement that was ever thought of, and they go from the one to the other, so as to receive in succession the most dissimilar impressions.

An effeminate feebleness of mind is the consequence of these habits; and it is confirmed by the circumstance that the highest ambition of a gentleman here is to be thought agreeable by the ladies, for by matrimonial alliance alone can he improve his fortune, or increase "the number of souls" belonging to him. The mode of life above described, nevertheless, and deeply impressed religious sentiments, make the Moscovite nobleman a good-natured being, which is the more important, since he ordinarily exercises a direct influence on the fortunes of from 500 to 1000 people.

We left Moscow on the forenoon of the 29th of July; the sky was clear and the heat oppressive. All the way to Bogoròdsk, forty-eight versts, we saw well-cultivated fields of potatoes, barley, and buck wheat. Wherever wood occurred, the oak seemed to predominate, and evidently grew much better here than to the west of Moscow, where it dwindles to a mere bush. The village of Novaia is adorned by a handsome, well-built country house belonging to the Galitzin family. Bogoròdsk, though the chief town of a circle, is hardly distinguishable from an ordinary village. The name and rights of a town belong in Russia to all places in which the majority of the inhabitants become enrolled, on certain payments, in the civic guilds. But as the peasants generally divide their time between mechanical arts and field labours, there is but little difference intrinsically between the town and the village.

The wooden houses of Bogoròdsk have steps to the doors and covered balconies. The bath-chambers bear witness to the cleanliness of the people. At the front door of the house there is usually hung up an earthen vessel, called *rukamóinik*, or hand-washer, which is used by the people of the house every morning. This expression, as well as the custom which gives rise to it, reminds one of the χέρνιψ of the ancient Greeks. But in the houses of the wealthy, water is poured on the hands by a servant, the Rukamóinik being placed underneath to receive it, just as we find the custom described by Homer.

On our road yesterday we were given to understand by certain appearances of vegetation, that the rock was near the surface. To-day (30th July) this intimation was confirmed in Bogoròdsk, for we saw in the streets large masses of stone, and were conducted to the quarries whence they were taken, in the hills to the east of the town. There we found horizontal

strata of compact quartz, generally yellow, but sometimes brown, and bearing marks evidently made with the spines of encrinites. This rock resembles the quartz drift on the eastern side of the Valdài so perfectly, that the origin of the latter may be referred without hesitation to this place.

We proceeded to-day as far as the village of Pokròf, forty-six versts from Bogoròdsk. For some distance the road continued at the elevation attained at the last-named place. A layer of good soil covered the rock above described, and the fields had the look of great fertility. At the river Kliásma we descended about 100 feet below the level of the plain of Bogoròdsk. We were disappointed in our expectations of finding the underlying rock exposed on this declivity. The banks of the Kliásma are covered with sand, dry and barren; and we often observed in the plains of Russia that the tracts bordering on rivers are more parched and unproductive than the adjoining country.

Platóva, twenty-tree versts from Bogoròdsk, has a very pretty situation. It is surrounded by meadows of luxuriant green, with a rivulet winding through them, and bounded on the west by woods. Here the peasants are not so much devoted to the service of the road as in the northern governments, and to-day, for the first time, we were obliged to wait while horses were brought in from the fields. The delay thus occasioned we turned to account by making magnetical observations. We also took a stroll in the woods, where we killed a falcon, which agreed well with Pallas's description of the migrating falcon (F. peregrinus). Its crop was full, containing the remains of a frog and of a small snake.

We passed the night in Pokròf. Here the chamber walls were adorned with rude carvings and paintings, the subjects of which were taken from the events of 1812, and represented the valiant deeds of the pea-

sants. It would appear that the painters of the holy images (Obrasà) had sallied beyond the bounds of their ordinary sphere of art, to treat these historic subjects, for the inscriptions spoke the language of the church—the old Sclavonic. The French troops, it must be observed, never penetrated further than Búíkova, a village forty miles east of Moscow.

From Pokròf to Dmitrièvsk, fifty-six versts, we went over a level and monotonous country under tillage. About ten o'clock (July 31.), a short way from Pokròf, we had a most violent storm. The horses seemed terrified at the heavy rain, and perhaps at the thunder, for while the storm lasted they could not be induced to move. The drivers told us that this is the season of thunder storms, and that nothing of the kind ever takes place in winter. That the thunder storm, in European Russia, assumes in general a very impressive character, is manifest from the name of the phenomenon—*grōsà*, which implies something terrible. The people here uncover the head and make the sign of the cross at every clap of thunder. This reminds us that all the Sclavonian tribes, previous to their conversion to Christianity, agreed in worshipping the god of thunder under the name of Perùn, while they differed from one another in almost every other article of their polytheistic creeds.

About noon (August 1.) we reached Vladímir, twenty-two versts from Dmitrièvsk. It occupies a fine position on the left bank of the Kliásma, and, from the number of its stone churches and other buildings, presented a spectacle to which on the latter part of our journey we had been little accustomed. Vladímir is famed for its cherries: we were, therefore, surprised to find that the temperature of the ground was hardly higher here than at St. Petersburg. The success with which fruit is cultivated in its vicinity must be ascribed to the careful application of the expedient

88340

employed at Torjòk. This is rendered easy by the numerous deep furrows formed by watercourses in the hills along the river, and in which the fruit trees are planted with a southern exposure.

The public edifices of Vladímir are on a scale far beyond the present importance of the place, which like Novgòrod, has outlived its prosperity. The natural strength of its situation, and its proximity to the Tatar borders, formerly made it a place of great resort. But in Russia we frequently see traces of a prosperous individual existence which has been destroyed by the system of centralisation; and this reminds us how different is the course of political development in Germany; for there, the anciently connected whole has a tendency to separate into independent states, while in Russia separate principalities are absorbed in the newly-arisen unity of the empire.

We arrived in Barákova, twelve versts from Vladímir, on a holyday, which had brought together the people from the neighbourhood, as might be inferred from the vehicles fastened before the house doors. The inhabitants were all in church, except those busied with preparations for the feasts about to follow. Pains were taken to induce us to stay. We were reminded in proverbial language that "no bird builds its nest on a holyday; then why should a man travel?"

In Súdogda, fifty-eight versts from Dmitrievsk, we made our observations and spent the night. Here a brisk trade has led to the establishment of an inn, where fixed charges take the place of the usual reply, "Whatever you please," made to the traveller who wishes to pay for his entertainment. In other respects the inn differed little from an ordinary private dwelling; nor was it without hesitation that our host received a second party who arrived there contemporaneously with us. We shot some wild doves, but

could not induce the people to dress them. It appeared that a religious feeling prohibits among them the killing of these birds. The inhabitants are very proud of their shops, in which, as they say, "every thing is to be bought." Yet, except the wine of the Don, which is obtained from the caravans passing by, we saw here nothing appertaining to luxury. The supply, thought so various and abundant, was adapted only to the most frugal life. Prosperity has not yet banished simplicity of manners from Súdogda, and in the evening the inhabitants were amused in the street by a herdsman's not very musical performance on a cow's horn.

In the streets of Súdogda were large blocks of hard limestone and also of compact gypsum, found in the neighbourhood. We arrived in the evening at Múrom (August 2.), eighty-four versts from Súdogda, on the left bank of the Oka. This place was very famous at the time when Christianity was first introduced among the Russians; but the popular traditions, having reference to that period, are now so much disfigured by fable, that no dependence can be placed on them. In the woods south of Múrom, there is said to be a "robber-nightingale," which entices travellers by its song and then kills them by the power of its notes. The oppressive rule of the Tatars, which destroyed the ancient monuments of the place, has left proofs of its long continuance in the features of the inhabitants, whose physiognomy differs decidedly from that of the Russians.

August 3. The town stands on a steep bank overhanging the river Oka, and which, yielding to the combined attacks of flood and frost, is continually giving way. Near the ferry where we crossed the river were a number of flat-bottomed vessels, which descend to the Volga and thence go to Nijneï Novgorod. Their masts were adorned with pennons

and vanes of wood. To-day we had some showers in the morning, followed by a hot sun. The hollows near the Oka were covered with the richest grass, and decked with a great variety of meadow flowers. Starlings were collected here in multitudes, preparatory to their migration southwards. At the end of twenty versts this rich meadow land was succeeded by a pine forest on a sandy soil. On the boughs of the pines were hung wooden hives in which the wild bees deposited their stores of honey, to be carried off by the peasants in the neighbourhood. This was the first trace we saw of systematic attention to honey, as an article of husbandry.

At Monakóvo, thirty-one versts from Múrom, we were again close to the Oka. The steep sides of the hills on which the village stands showed, where laid bare, strata of variegated sandstone. Here we met with an officer from Tobolsk, who was on his annual journey to the capital, with a train of loaded waggons, bearing the tribute of Western Siberia. From this to Osáblikovo, where we staid for the night, the agreeable character of the landscape, with its variety of surface and its cultivation, continued. A conical hill pointed out to us was said to be formed of alabaster. The specimens shown us of the rock in question resembled perfectly the compact gypsum of Súdogda.*

(August 4.) Our approach to the fertile land of Nijnei Novgorod grew every instant more perceptible. The soil here is sufficiently firm to form a good road without pavement. It has a reddish hue, contrasted with which the rich verdure of the fields seemed doubly grateful. The villages along the road bore the unequivocal characters of a land of plenty: Bo-

* This place was very memorable, in reference to the chief object of our journey, for the magnetic observations which I made there show that The Line of no Declination passes close to it.

goródsk, in particular, which we reached to-day at noon, was thus distinguished. The peasants' houses were all carefully put together, and were ornamented in a way that bespoke both means and leisure. Boards, a foot wide, cut through in patterns like lace-work, ran along the fronts of the houses, and, considering the want of mechanical resources, bore witness to the skill as well as taste of the workmen. A piece of carved-work, generally a horse's head, adorned the point of the gable. The inhabitants of this village were remarkable also for their healthy and agreeable looks. On account of the active traffic on this portion of the road, there were here some stores well supplied with horse furniture of every kind, and also a row of blacksmiths' shops, twenty or thirty in number. We passed the night in Doskíno, sixty-three versts from Osáblikovo, in the humble dwelling of the priest.

CHAP. V.

NIJNEI NOVGOROD. — THE GREAT FAIR. — MARKET BUILDINGS. — ARMENIANS. — BOKHARIANS. — COTTON TRADE. — FABLE OF THE LAMB-PLANT. — BOKHARIAN SHAWLS. — CHINESE QUARTER. — THE MORDVI. — NUMBERS FREQUENTING THE FAIR. — AMUSEMENTS. — PHYSICAL FEATURES OF THE COUNTRY. — BANKS OF THE VOLGA. — FALL OF THE BANKS. — HISTORY OF NIJNEI NOVGOROD — ITS TRADE. — MAKARIEF. — THE GRUSINSKI FAMILY. — LUISKOVO. — REVENUE FROM MAKARIEF — AND FROM NIJNEI. — VALUE OF IMPORTATION. — POPULATION. — TAXES.

From Doskíno the road continued over the hills, through scenery like that seen yesterday, and always a mile or two from the river. The water was rarely visible, and hence the flights of river-birds moving from place to place had a singular appearance. About eleven o'clock in the forenoon (August 5.) we reached Nijnei Novgorod, the church-towers of which may be descried a great way off. We were eager to see a place, the influence of which on the industry and prosperity of the country to a great distance around we had been long aware of. The streets parallel to the river, and which we first entered, were well built, and handsome glass windows — hitherto seldom seen on the journey — were here common. The streets were as well paved as those of St. Petersburg and Moscow. At the same time, raised as our expectations were, the forlorn and deserted condition of the place seemed to us quite mysterious. Except the soldiers of the garrison, hardly a soul was to be seen in the streets. On our reaching the inn, however, in one of the streets running down to the Oka, we learned the cause of the death-like quiet which so much surprised us.

The annual fair was then actually going on, and during its continuance, the bustle and the traffic are wholly transferred from the upper town to the quarter along the river. To this quarter we daily directed our steps during our four days' residence in Nijnei.

The open place in the upper town extends to the edge of the plain, where it forms a rounded angle, projecting just above the junction of the Volga and the Oka. Towards the former river, it is fenced by a stone parapet, whence one has a full view of the majestic stream below and of the low level country extending beyond it to the horizon. Towards the Oka the descent is more gradual, and there, between the street and the river, stands a handsome row of stone buildings, contrasting singularly with the old and weather-stained wooden houses opposite to them, in which rope-making and other trades, subservient to the navigation of the river, are carried on. Crowds were collected round the wooden shops outside of the houses; but the further we advanced the greater was the throng, and the movement of the multitude was evidently directed towards some distant point. At length, a turn to the right brought us to a bridge of boats, raised but little above the water.

Here, in close contact with the motley throng, we could not remain inattentive to the number and variety of strange costumes and physiognomies around us; and for the first time since we left St. Petersburg we heard foreign tongues overpowering and extinguishing the Russian. Having crossed the Oka, we found ourselves among wooden booths arranged in quadrangles, and numerous enough to satisfy our expectations of a great fair. This part, which is first approached, is given up to the retail trade. The usual variety of a Russian bazaar was to be found here, but on a scale far surpassing in magnitude any thing we had seen before. We were astonished,

however, to find that these magazines, which, taken together, would have made no inconsiderable town, were but temporary appendages to the far more colossal market.

Beyond the space occupied by the wooden magazines are solid stone edifices, of a single story, surrounded by colonnades, and roofed with sheet iron painted green. These are all warehouses, and form sixty-four rectangular blocks of building. In the middle of these stands a lofty and noble edifice, occupied by the officers who are charged with the superintendence of the fair. The ground floor of it becomes at this period the post-office, which is not to be easily matched for the wide extent of country embraced by the communications passing through it; for the letters received by the Armenian and Bokharian merchants, from their remotest Asiatic correspondents, meet here with others from all parts of Europe.

The inner range of warehouses contain articles of European luxury. In those filled with the works of the French môdistes, or with the productions of St. Petersburg or Moscow, we might fancy ourselves transported into the midst of some European capital, if it were not that at every step the passers-by remind us of the preponderance of Asiatic traffic. Books and maps have a row of warerooms to themselves. Then follow the depôts of *Obrasá*, or Greek holy images, of every shape and size, as well as of amulets, wax candles, and various matters used at funerals, or in other solemnities of the Græco-Russian Church. Most of the holy images are made in the Ural; but some of them are the work of self-taught peasants, throughout the villages, who think that a peculiar merit attaches to this kind of industry. The dealers in these articles both buy and sell by retail; and their business, in conformity with popular notions, is called "truck" (vuimenàty); because it is not deemed right

to buy matters of a sacred character for money, and they are paid for, therefore, in other articles of equal value.

That precept of the Greek church which allows of only linear and not relieved representations of the holy personages regards merely the uncovered part of the figure, but the dress may be in relief, and is usually adorned with gold or silver leaf fastened on the wood. Hence it is that the pictures of holy families and saints offered for sale have frequently only the faces and hands painted, the rest being left unfinished, so that the purchaser in completing the decoration of the picture, is at liberty to consult his own piety and discretion, and to dress and gild it according to his means. The dark-brown complexion given to these images and pictures might be ascribed in some measure to the nature of the pigments employed; but the obliquity of the eyes, which is particularly observable in the pictures of the Virgin, shows that the Mongolian physiognomy was that which was most familiarly known to the original designer of these portraits, the peculiarities of which have been preserved by the pious care taken to copy them faithfully.

The outer ranges of buildings in the market are occupied chiefly by foreign nations; south-eastwards, towards the Oka, are the warehouses of the Greeks. North-westwards the Armenians have a very extensive quarter to themselves, where they are so numerous and so little interfered with, that they seem to be in their own country. The costume of the Armenians is extremely elegant. The perfect fairness of their skins, too, with their deep black hair; their grave and handsome features, tall figures and dignified carriage, would entitle them to be considered as the noblest type of the human race; and heighten the contrast between them and the Bokharians, with whom

they seem to be more immediately connected in the way of commercial intercourse. The talent and perseverance displayed by the Armenians in their incredibly extensive journeys through southern Asia have obtained for them especial favour even from the government of Bokhara, although they are, as Christians, quite as zealous as the mercantile class among the Russians. In the market here they are wholesale dealers in Russian and other European goods which are carried off to Khiva, Bokhara, Afghanistan, Thibet, and China. In return, they bring to Nijnei cotton and silk fabrics, and, above all, Kashmír shawls in large quantity.

The Bokharians whom we saw here were for the most part of middle size, remarkably corpulent, and, as it were, bloated. Their upper garment (called here by the Turcoman term Khalàt), carelessly thrown round them, contributed to give them an enervated and shapeless look, and with their heavy, awkward gait, made them as different as possible, externally from the Armenians. Their hair, which they suffer to remain only on the temples, is black, stiff, and long. Their shaved heads they cover with a flat, quilted cotton cap. Their countenances had the expression of indolence and good nature. Their skins were of a dark brown, like that of a mulatto; but this was clearly the effect of exposure to sun and air during their long journeys of 1500 miles over unsheltered steppes. The Bokharians settled in the towns of Siberia also travel hither, and serve as agents and interpreters between the Russians and their newly arrived fellow-countrymen. These are in general distinguishable from the Tatars, among whom they live, only by their peculiar corpulence.

The traders who come direct from Bokhara are not themselves the absolute owners of the imported goods; but they receive these on credit from wealthy

capitalists, and pay for them, on their return, the price in Bokhara, together with 30 per cent. interest for the advance. It is said that the price of goods imported from Bokhara into Russia is enhanced 70 per cent. by the journey. In case of loss from fire or robbers, the borrower is still bound to fulfil his contract; and hence it is, that the plundered travellers who effect their escape from the Kirgiz prefer settling in Russian towns to returning home to Bokhara.

There is another kind of contract between merchant owners and caravan leaders, by which the latter are bound, on the completion of the adventure, to give half of the profit to the former. The cotton imported by the Bokharians, partly raw, partly spun, is a chief object of the trade of Nijnei. Now that this product of Southern Asia is imported in abundance, it is curious to look back at the fabulous accounts of its origin which were current in Russia, not quite a century ago. It appears to me quite certain that the story of the zoophytic plant, called Baránez, or lamb-plant, (formed as a diminutive, from Barán, a sheep,) originated in some embellished account of the cotton plant. Herberstein relates it at full length and unchanged, just as he had heard it: the astronomer Chappe d'Auteroche afterwards added some misconceptions, which evidently arose from his imperfect acquaintance with the Russian language.

Herberstein gives the statement of a Russian: "Vidisse se (circa mare Caspium) semen, melonum semini paulo majus et rotundius, ex quo in terram condito quiddam agno persimile, quinque palmarum altitudine, succresceret . . . . . quod eorum lingua *Boranez*, quasi agnellum dicas, vocaretur, &c. &c. . . . . pellem subtilissimam habere, *qua plurimi in eis regionibus ad subducenda capitis tegumenta uterentur* . . . . hanc rem minus fabulosam puto, ad gloriam Creatoris, cui omnia sunt possibilia." The

German edition of Herberstein (Basil, 1563,) adds, that "the Boranez has a head, eyes, ears, and all the limbs, like a sheep." But it mentions correctly "*the very fine fleece which the people of that country commonly make use of to pad their caps withal.*" This is the ordinary use which the Tatar tribes in general make of cotton at the present day. When Chappe afterwards related that the Baránez (or, as he corruptly writes it, Baramjäs) grows in the country round the city of Kasan, it is obvious that he was misled by the popular use of the name Kasan, which formerly comprehended vaguely all the Mohammedan principalities on the south-eastern borders of Russia.

Among the goods imported from Bokhara, the shawls manufactured in that place are of great value. It is asserted by the Russians that these costly fabrics are made of the soft downy hair of the dromedary's belly; and that the yarn used for that purpose is, consequently, exactly similar to that spun in the government of Orenburg and at Troitsk. Yet it must be remarked that, throughout Southern Russia the wool of goats is used not unfrequently for the same purpose, and hence the name of *goats' down* is commonly given by Russian traders to the finest yarn.

The shawls of Bokhara are formed of two strips about eight inches wide, sewed together so neatly, that in coloured pieces it is impossible to detect the joining. The white shawls have a variegated border, which is said to be made of the fibrous cuticle of a plant described by the Russians as a sort of nettle. One of these white shawls will often sell here for 12,000 roobles.

The Bokharian traders take from the Russians a large quantity of bar iron, which is made in the Ural of the size and proportions found by experience to be most convenient. That the bars may be easily

packed on camels without danger of wounding the animals' sides, they must be but five feet long, three inches broad, five eighths of an inch thick, and have their edges carefully filed round.

On the side of the market-place which is next to the Volga stands a mesjid, or mosque, built of stone, on a circular foundation, for the Bokharians and other Mohammedan strangers, who are here exceedingly numerous; and close to it rises a cylindrical tower, of slender diameter, but considerable height. From this we have heard resounding, several times a day, the powerful bass voice of the subordinate priest calling the faithful to prayer. In the simple, unadorned interior of the edifice we saw only a scattered few of the Bokharian traders engaged in their devotions. On the terrace round these buildings was stationed a guard of Kosaks, who proved to be Mecheryák Tatars, themselves Mohammedans settled in the governments of Nijegorod, Kasan, and Orenburg.

At the other end of the market-place, but on the same side, stands the Armenian church, a highly decorated pile of building. Between the sacred edifices extends a row of houses arranged and ornamented after the Chinese fashion. Here is carried on the Chinese trade, which is no inconsiderable portion of the whole. The articles herein comprised, the most valuable of which is tea, are purchased on the Chinese frontier by Russian agents in Siberia, and forwarded by them to Europe. It is but rarely that Chinese merchants fetch their goods to Nijnei on their own account.

The Tatars occupy the first row of wooden buildings, which were crammed with peltry and leather in different states of preparation. But the Tatar trade lies chiefly in young, wild horses' skins. These are, generally speaking, of a mouse-grey colour, with a deep black mane, which is thought highly orna-

mental to cloaks or pelisses. These horse-skins are much prized by the Mecheryáks and Bashkírs, who believe them to be particularly warm. On the doors of the Tatars' warehouses the owner's name was always written with chalk in Arabic characters.

In the multifarious throng of the market may be easily distinguished, by the peculiarity of their appearance, the people called by the Russians Mordvi (in the singular, Mordva), here of the tribe who call themselves Arsa. As the aboriginal possessors of this tract of country, and offering little resistance to the encroachments of the Russians, they have been allowed to retain their ancient customs. Both men and women wear smocks of white linen, richly ornamented towards the upper border with red and black threads. The figures of this embroidery are not imitated from natural objects, but are composed of lines fancifully yet symmetrically arranged, and have a good appearance.

The language of the Mordvi, and their manners for the most part, unite in proving them to be of the Finnish race. But they differ widely in the robustness of their frames and their blooming complexions, from the other branches of the same race (the Esthonians in particular) whom we had already seen. The influence of some foreign elements may therefore be assumed in this case; and yet the deviation from the type of the race cannot be well ascribed to an early intermixture with the Russians, for the difference between the Mordvi and the other Finns strikes the Russian inhabitants of this country as much as it does strangers, which surely would not be the case if the explanation of the phenomenon in question were of a kind so likely to be familiarly known to them. Among the remarkable peculiarities of this people may be mentioned their unwillingness to put animals to death, and their love of leeks, onions, and

bulbous roots of all kinds. It is only when they offer a sacrifice to the Supreme Being—a rite still performed by the Christian portion of the community, who form the great majority — that the Mordvi kill an ox. It may be that they have imbibed some notions from the Mongolian tribe of the Turguts, who left China with 60,000 families in 1636, and settled on the banks of the Volga, where they continued till 1771. The Mordvi visit the market only as buyers, for their own produce, chiefly honey, is disposed of to the Russians settled in their neighbourhood.

It is well known that the annual fair was transferred to Nijnei Novgorod in 1817, in consequence of the destruction by fire, on the 17th of August, 1816, of Makárief, 54 miles lower down on the Volga, where it was previously established. The construction of the requisite works was intrusted to the late General Betancour. In the first place, the site chosen for the market was surrounded with running water, by means of a canal, which unites the Volga with the Oka about eight miles above the town. The ground thus enclosed being originally swampy, it was necessary to place the foundations of the stone buildings on piles, and it was only by covering the site of the market to a considerable height with sand, that a dry surface during summer was at length obtained. But in spring the whole market-place is still overflowed by the Volga.

In that part of the market which is built of stone there are 2522 store-rooms, to each of which is attached a chamber for the owner of the goods to live in. The number of the wooden booths, or, as they are here termed, balagáni, i. e. *arbours*, varies with circumstances. Of late years, however, about 1500 of them have been hired by traders. In buyers and sellers, caravan drivers and common labourers, the

whole number collected together in the lower town during the two months' fair, has been for the last few years not less than 600,000 people, who disappear totally when the fair is over. The precautions taken to obviate the consequences of confusion and disorder in such an immense and so mixed a multitude are wonderfully perfect; and the scene of lively and varied traffic presented by the fair is altogether one of the most cheerful kind. Great attention is paid to cleanliness: the sewers under the market-place are washed out by means of pumps once a week during the fair; and if these supply but a feeble stream, yet their deficiency is made good by the annual overflowing of the Volga.

It was not till sunset that the activity of business diminished, and then, for the first time, we saw the mingled crowd begin to turn away to the various spectacles and places of amusement established near the wooden booths. The equestrian performances of Chiarini, hitherto known only to the more civilised parts of Europe, excited this year the amazement of the simple-minded Mordvi, and of the Asiatics, who, though not equally rude, are yet but little acquainted with the proficiency of Europeans in this and similar arts.

Still more brisk was the general movement towards Kunávi, a village a short distance up the Volga, just beyond the canal. The road thither was enlivened by a bustling throng; but in the place itself the tinkling of the balaláika, or guitar of the country, played for the dance, resounded from all the houses, which were handsomely painted and gaily lighted up, and professed, in terms suited to the warm fancies of the Southerns, to contain all the joys of the Mohammedan paradise. The Bayaderes of Kunávi are for the most part natives of Russia, and it is said that every year, at the beginning of the fair, several vessels

arrive here freighted exclusively with new inmates of this place of pleasure: others at the same time return to their native villages, in which, since the introduction of servitude, there is much less value set on the chastity of unmarried females than was originally the case with the Russians.

In the long streets of the lower town, along the right bank of the Oka, which we had surveyed but superficially on our first approach to the market, we found, on examination, that the row of stone buildings which stands furthest from the river is particularly destined for the reception of the European merchants. On the opposite side of the street we remarked a lofty edifice, belonging, as the inscription on it informed us, to a Russian Bible Society. Religious tracts and writings of all kinds were offered for sale in several wooden stalls before the door of this house. Whether the Scriptures were to be had there in any other language than the Sclavonian, I had no opportunity of observing, but that such was the case seems likely, from the circumstance that the sign-boards announcing the contents of these stalls contained some titles in Syrian and Arabic characters.

Respecting the important fair of Nijnei Novgorod, as well as the influence which its recent organisation has exercised on the country connected with the town and jurisdiction, I received some valuable information from General Bakhmétief, at that time Governor General of the united governments of Nijegorod, Pensa, Kasan, Simbirsk, and Saratof. A description of the government of Nijegorod, founded on local chronicles and statistical documents, has also been written in Russian by M. Dukhófski, a master in the Gymnasium at Nijnei, and was printed at Kasan in 1827. Many particulars of a local character were related to us by the inhabitants.

The grand feature in the physical character of the

government of Nijegorod is the wide difference between the opposite banks of the Volga. This majestic river, the breadth of which below Nijnei Novgorod, even in the warmest time of the year, is not less than two thirds of a mile, forms the line of demarcation between two totally distinct regions. On its right bank, steep cliffs show the termination of the plain towards the south, which has an average elevation of 150 feet above the level of the water, and is every where well adapted for tillage, and productive. But north of the Volga plains of little elevation extend far and wide, the sandy soil of which affords, even in the most favoured spots, but scanty crops of corn.

On the elevated plateau south of the Volga, garden vegetables, apples and plums of different kinds, may be obtained every where in abundance; but on the northern flats, not the least garden-cultivation can be made to thrive, notwithstanding the great industry of the inhabitants. In the circle of Semonof, consequently, which is on the northern side of the Volga, the chief occupation of the people consists in gathering wild berries and in making wooden vessels of all kinds, which are sold in the markets of the more productive region to the south. It would be hard to find any where two contiguous tracts differing in so marked a manner as to productiveness. As to the external differences between them, which may be supposed to account for their difference in respect of fertility, the chief is that of elevation, which, on an average, hardly exceeds from 150 to 200 feet; and the difference of the soil, which on the heights is marly, on the flats is mere sand, on which a turf forms only here and there.

There is a third circumstance, also, which, itself probably a consequence of those already named, constitutes a new and very important cause of the unequal increase of vegetation on the two adjacent tracts in question.

The average quantity of rain is stated on all hands to be much less on the left bank of the Volga than on the right.

The elevated plateau rises above the neighbouring plains like a promontory pointing to the N.W., its narrowest end being at Novgorod; for the left bank of the Oka, too, is uniformly low throughout this government, yet it has a fruitful soil, and is not deficient in wood like the plains north of the Volga.

The steep-sided ridges overhanging the level plains are all of the variegated sandstone formation. Owing probably to the washing out of masses of gypsum which lie imbedded in the marly strata, caves and holes are formed in the cliffs, and occasion slips, which are of frequent occurrence on the edges of the elevated plain. Falls of this kind have taken place at Nijnei within the memory of persons now living. In the reign of the Tsar Fedor Ivanovich, the convent of Blagoveshchenya (Salvation proclaimed), which was built on the edge of the plain, fell into the river, and the caves in the precipice, which, according to the Græco-Russian custom, were used as monks' cells, or as places of pilgrimage, were filled up with rubbish.

The sandy plains north of the Volga are hardly more than 200 Parisian feet above the mean level of the sea. But if we suppose that, at an earlier period of the earth, they formed the bottom of a sea extending from the south-east, the last and constantly decreasing remnant of which is probably exhibited to us in the Caspian Sea, then the steep sides of the elevated plain would stand as cliffs over the water, just as similar cliffs of the same kind of sandstone rise abruptly at the North Sea. And in the latter situation, too, sandy downs are deposited to such an extent at the foot of the cliffs, that a broad strand is gradually formed which separates the sea more and more from the walls of rock.

At the period whereat Russian traditions take up the history of this country the northern flats of the government of Novgorod were occupied by tribes of the Chudish (Finnish) race; tribes who, wherever they have been found, seem to have a predilection for those portions of the earth which have been last deserted by the sea, and whose name, Sămalaïn, or Swamp-born, for so they call themselves, may possibly preserve the memory of some remarkable event of the earliest ages.

In the thirteenth century, as the Russians, who were at first only thinly scattered among the settlements of the Finns, grew stronger, they formed their possessions into a principality; and though the natives were allowed to retain their national usages, yet they were looked upon as a subjected people. In 1222, under the Grand Duke George II., was built a wooden fort, on the high bank of the Oka, where the upper town now stands, which was intended as a defence of the Russian territories towards the N. E. and to keep in check the neighbouring tribes of the Mordvi. These earliest walls and barricades soon fell to decay, so that, according to the chronicle, not a trace of them remained at the end of the sixteenth century. The rulers of the land, however, had settled, with their vassals, near the fort, and this circumstance, with the great fertility of the adjoining country made the lower town of Novgorod even then an emporium, and the most flourishing part of the northern dominion. Hence, in 1469, that city was chosen as the fittest rendezvous of the army which Joan was sending against the faithless Tatars of Kasan.

In the mean time the principle of centralisation, which was already gaining the upper hand in Russia, and the tendency of the originally independent parts to coalesce, had united, towards the close of the fifteenth century, the principality of Lower Novgorod

with that of Moscow, and voyevodes, or imperial dukes, now administered as viceroys the several provinces of the empire. But attention was still paid to the natural advantages of that fine tract of country. In 1509, the Tsar Vasil Joánovich laid the foundation of a new citadel (Kreml) of stone, which had a compass of 927 fathoms. Novgorod acquired still higher importance in the popular estimation, from the valour of one of its citizens, Minín Sukhorúky, who, joining in 1612, the Moscovite noble Pojarski, and bravely leading his fellow-townsmen, whom his exhortations had induced to take the field, released his country from the tyranny of the Poles. The people of Novgorod are still proud of his fame, and show his monument in their old cathedral church, adorned with the colours of the local militia raised in 1812, to show how the old patriotic spirit can revive.

A statistical account of the city and its resources at the beginning of the seventeenth century, has been recently found in the archives of the government. Even then the town was divided into the upper and the lower settlements; these together contained five convents, two cathedrals, and twenty-three parish churches, all built of wood. The clergy and their attendants occupied 130 houses. The whole number of houses in the town at that time was 1382. The chronicle mentions as buildings of a special character the Bazaar or Market-house built by the Tsar, the custom house adjoining it, the wooden shops of the Russian traders, and those set apart for the Tatar merchants settled in the town: there was a court house and also a mansion with gardens given by the sovereign without charge to the descendants of Minín, as a token of gratitude. It is interesting to compare the city, as it is at present, in respect of construction and population, with what it was 200 years ago. It now reckons 38 Russian churches, beside an evan-

gelical chapel for resident foreigners. The private houses amount to 2074, of which 145 are of stone.

On the whole it is manifest that a considerable increase has taken place in the population; but it is more important to remark the advantageous change which shows itself in the proportions of the different classes. At present the male inhabitants of the labouring and productive classes exceed 6000, while those in the civil service hardly amount to 1000. In the seventeenth century, the industry of the place was in a comparatively very low condition, if we may judge from the return of the houses belonging to the different classes. At that time the men of the labouring and productive classes were to those of the unproductive, exclusive of the military, as two to one; whereas the producers are now to the non-producers as six to one. The population of the town amounted in 1825 to 18,000; but it is constantly increased by the number of foreign merchants who settle in the place and by the influx of industrious workmen.

A few particulars respecting the gradual development of the great trade which is carried on in the government of Nijnei Novgorod may be fitly introduced here, for it is still to this trade that the city and the province owe their chief importance. This is manifest from the circumstance that the constant population of Nijnei Novgorod hardly forms a thirty-third part of the numbers who annually meet here for the sake of traffic.

The Chronicle of the seventeenth century informs us, that Nijnei Novgorod and its immediate neighbourhood contributed at that time to the public treasury the very moderate sum of 460 roobles; of this amount 125 were levied on the Russian and Tatar ware-rooms, 198 on the German booths. The inn which was then, as at present, opened in the upper town for the reception of strangers, yielded annually 72 roobles,

the lakes and the pasture lands near the town made up the remainder. But it must be observed, that the rooble here meant is the silver rooble, the nominal value of which is even now four times that of the rooble paid in copper or bank paper; and furthermore, in estimating the value of the articles taxed, it is necessary to bear in mind, that the value of the precious metals has fallen considerably during the last two centuries. Besides, a large share of the trade was at that time carried on at another point in the present province.

So long as the independent kingdom of Kasan was able to maintain its rivalry with Russia, its capital was looked upon as the more convenient rendezvous for the neighbours of the Tatar dominions on both sides*—the Russians and the people of Southern Asia. Russian merchants went there every year to procure for the northern provinces the productions of southern climates. The trade was, even under those circumstances, extremely brisk, and among the various articles which then reached the markets of the north, were many respecting which the Russian traders knew only through obscure reports, whence they originally came. The tradition above alluded to, respecting the origin of cotton, descends, no doubt, from those times.

It was not till the inhabitants of Kasan had frequently treated their Russian visitors with oppressive and sometimes fatal violence, that the latter resolved to discontinue these journeys, and rather to endeavour to attract foreign traders to the Russian frontier

* Before the beginning of the fifteenth century, this principality was also usually entitled, in Russia, the kingdom of Bulgaria. After the destruction of the city of Bulgari in 1400, and the removal of the seat of government to Kasan, the expressions, Tatars of Kasan, and kingdom of Kasan, remained alone in use. — Lehrberg's Untersuchungen über die ältere Geschichte Russlands (Researches into the early History of Russia), tom. i. p. 21.

towns. In this view, factories were established at Troitsk and Orenburg, and also, as the Siberian territories of the Russians increased, on the southern borders of the government of Tobolsk. We shall afterwards have to relate, how even while Kasan was a flourishing market, and before the Russians had made themselves masters of Northern Siberia, the southern Asiatic traders often ventured a long way north on the eastern side of the Uralian mountains, in order to barter with the natives. But these long and remarkable journeys grew less frequent, as the chiefs of the southern caravans found that they could obtain on the Russian frontiers, without further trouble, all the productions of Siberia. At the same time there was felt the necessity, on the other hand, of establishing, in the interior of the kingdom, a new emporium, to which the productions of the south, collected on the frontiers, should be forwarded, by Russian and even by foreign traders, those of Bokhara, however, being still excluded.

The place chosen for this purpose was Makárief on the Volga, eighty versts below Nijnei Novgorod. It was recommended both by its situation on the majestic stream and its proximity to what was then the frontier of the empire. This new establishment existed at the date of the statistical document already referred to, descriptive of Novgorod, and thus we see why the latter place had at that time so little importance. The new fair soon attracted traders from all quarters. We have been able to find only very incomplete information as to the amount of business done in the market in the time of Catherine. The letting of the booths then brought only 5000 roobles to the treasury, and the annual trade has been roughly estimated by Georgi at some millions of roobles.

It was about the time of the accession of Alexander I., that the trade of Makárief began to develope to

such an extent, as to become one of the chief resources of the empire, and consequently new and successful steps were taken to secure its further improvement. Now for the first time the Bokharian traders were allowed to bring their goods across the frontiers, and particular favours even were extended to them as inducements to visit the fair of Makárief.

The greater part of the store-houses were at that time annually erected on the right bank of the Volga, on a low piece of land, near the village of Lúiskovo, four miles from Makárief: this land belonged to the Grusinski family, who were settled in that quarter, and who claimed to be descended from the Grusian (Georgian) emperor Heraclius. The last but one of this family acquired a great name in the history of the fair of Makárief. The inhabitants of the country around bestowed on the lord of Lúiskovo, perhaps not without some reference to his reputed descent, the title of Tsar Grigori; and he justified the title by the very complete, though usurped, control which he exercised over both the Russian and foreign frequenters of the market, so that he annually figured as the temporary autocrat of the mingled crowds. Without office or authority, he often defended the foreign chiefs of the caravans most obstinately against the injustice of the imperial functionaries, and disregarding the police, he would proclain his regulations, and enforce the observance of them, almost always to the great satisfaction of the strangers.

On the other hand, it would appear that Grigori sometimes oppressed the wealthier Russian merchants, and in particular that he extorted contributions at times from the owners of the Uralian mines. Under the reign of Paul, the usurped powers of the Grusinski were the subject of frequent complaints at court;

but these produced nothing more than gentle admonitions to the Market-king, as he was styled; probably because his practical expertness as a manager was thought to outweigh his occasional misdeeds and to be conducive to the public interests. From the anecdotes related of Grigori's unpremeditated administrative acts, it would appear that he had a very decided predilection for his Asiatic kinsfolk, and did every thing he could in their favour, his perfect acquaintance with their language and peculiarities rendering him more capable of serving them. At the same time, however, he did not forget his own interests, which he took care of at the cost of the Russian traders. The immense wealth of the Grusian family is attested to this day by the rich decorations of the stone church built at Lúiskovo, in which are preserved translations of the Scriptures in the Grusian or Georgian language, and the church service is performed according to the Georgian ritual.

In 1808, under Alexander I., permanent, though still for the most part wooden, buildings were erected for the purposes of the fair at Makárief. At that time the sum annually added to the revenues of the state by the fair was about 140,000 roobles; the goods imported for sale were estimated at from thirty to forty millions of roobles.

The opportunity (which perhaps had been long wished for) of removing the great fair to the neighbourhood of some more important Russian town, where it would be more directly under the eye of the central administration, was afforded by the fire which destroyed, in 1816, the newly constructed magazines. The preparations which we have already described were then made immediately for transferring the general market and the traffic of nations to Nijnei Novgorod.

As a proof that the concourse from the south-east

contributes the largest share to this great assemblage, it has been remarked, that the further the place of meeting has been carried towards the north-west, the later has it been found necessary to fix the time for the transaction of business. Thus, at Kasan, in the sixteenth century, the 5th of July (new style) was the great day appointed; at Makárief, it was the 6th of August, and now since the third change of place, the time appointed for the despatch of the chief business extends from the 13th to the 29th of August. Considering the obstinacy with which Asiatics adhere to habits and transmitted usages, it is not likely that they have changed the time of starting with their caravans, so as to render fallacious the inference here drawn from obvious facts.

Since the new organisation of the fair, the sum which it yields directly to the treasury has fully increased threefold; for in 1825, the letting of the ware-rooms for dealers produced alone 382,934 roobles, above two thirds of which amount were for the stone buildings; and this does not include what was paid for the entry of the goods. A very large revenue is certainly necessary, as well to pay interest for the outlay, which, including the raising of the ground and constructing the foundations, is estimated at 40,000,000 of roobles, as to defray the annual cost of repairs; for even the restoring and maintaining of the floating bridges over the Oka are said to consume annually 30,000 roobles.

It is not from the amount directly contributed to the public treasury, however, that we are to calculate the advantage which the empire collectively derives from the fair of Nijnei Novgorod, but rather from the magnitude of the sums which circulate in it, and which seem to have nearly doubled within the last score years. According to the traders' statements, the goods brought to market in 1825 amounted to

70,806,000 roobles, and of these goods two thirds were in fact sold during the fair. Of tea alone the annual importation may be valued at 7,000,000 of roobles. About 4,000,000 poods of iron are sent every year from the Ural to Nijnei Novgorod. Although for the inland trade the average price of the iron cannot be assumed at more than two roobles the pood, yet it is much higher for that portion which goes in exchange for the merchandise of Bokhara.

In forming a comprehensive judgment of the importance attaching to the Nijegorod government in general on account of its advantageous geographical position, in any estimate of the prosperity of the empire, it must not be left out of view, that the trade carried on there at the time of the fair is far from being the only trade which proceeds from or centres in that government. Thus, in 1825 there were 2178 vessels employed in carrying Siberian merchandise to the fair; but in the same year 3362 similar vessels passed through the town without stopping in it. Many of these certainly were boats laden with salt from the government of Perm for the imperial stores; others carried Uralian iron direct to St. Petersburg; yet of the traffic carried on independently of the market, a large proportion has for its object the produce of the fertile country round Nijnei: and it has been calculated that in the year already referred to (1825), grain of the value of 4,570,000 roobles was despatched from the three chief markets, viz. Vasil Sùrsk, Lúiskovo, and Nijnei Novgorod, whither it was conveyed by the minor streams from the fertile districts south of the Volga.

With an area of 15,000 geographical square miles, this government had, in 1825, a population of 954,025 souls, who paid taxes to the amount of 14,000,000 of roobles. Of this population the greater part were of Sclavonian race, and belonged to the Græco-Russian

church: but a great number of sects have here sprung up among the labouring classes. In the circle of Semönof alone are thirty-six churches belonging to those sectarians of the "Old-creed," who, though they recognise priests (and are therefore called *Popofchina*), yet will have neither churches nor ministers in common with those of the prevalent persuasion. Still more numerous is the sect or *Roskol* of the Priestless-old-believers. (*Bepopófchina*) who separate their whole body into certain divisions which are here denominated *Skiti* (in the singular *Skit*). * It would appear that this term can be derived only from the root *skitátisya*, to rove or wander, and that *skit*, considered etymologically, therefore means nearly the same thing as Horde.

Each of these divisions contains several communions or districts, which are here called by the provincial term *Obiteli* (that is, dwelling-places, from *obitâty*, to dwell). The affairs of these communions are administered, sometimes by a male, sometimes by a female elder, who, enjoying general confidence, is elected by acclamation.

The Arsa and Mokcha tribes of the Mordvi form at present something more than a tenth of the population. The Tatars residing in the south-eastern part form three tenths of the whole. Cheremisses and Chuvashes are less numerous here than the tribes above mentioned; but they are known as industrious farmers, and particularly versed in the management of bees.

During our five days' residence in Nijnei Novgorod, we had uninterruptedly warm weather, as on the road from Moscow, and a perfectly clear sky.

* *Roskol* means properly a ramification or splitting off. In the word *Skit* we have undoubtedly the root of the Greek name Σκύθαι, for there is nothing unlikely in the change of the Russian long *i* into *u*.

CHAP. VI.

DEPARTURE FROM NIJNEI. — TROOPS OF EXILES. — VASILI SURSK. INDIGENOUS TRIBES. — OAK FORESTS. — DRESS AND SUPERSTITIONS OF THE CHEREMISSES. — BIELOI VRAG. — THE CHUVASHES. — THEIR DRESS. — THEIR TIMIDITY. — WOMEN'S ORNAMENTS. — SVAJIK. — RELIGIOUS PROCESSION. — THE TATAR POPULATION. — PASSAGE OF THE VOLGA. — KASAN. — THE FORTRESS. — FUR MARKET. — FRUITS FROM BOKHARA. — PISTACHIO NUTS. — CAVIAR. — THE TEA TRADE. — UNIVERSITY OF KASAN. — THE TATARS. — EVENING SERVICE IN THE MESJID. — TATAR HOUSES. — HISTORY OF KASAN. SUROFZOF'S RESEARCHES.

Aug. 9. — About 5 o'clock in the afternoon we left Nijnei and went as far as Poläna, three stages or about 53 versts on the road to Kasan, on the elevated right bank of the Volga, over which we travelled: the sides of the drains and ravines displayed sometimes marl and sometimes a quartzose sandstone. The surface of this plain here, as on the other side of Nijnei, is rendered undulating by the deep hollows in which the water runs off during the wet season. The rounded hills or ridges thus formed, are called by the Russians *Bugórki.* In many of the cross-drains of this kind, the sandstone strata near the surface are weather-worn and disintegrated; and in this loose and dry material, martens in great numbers construct their habitations.

On the part of the road gone over to-day, as well as on its further continuation, the traveller finds at equal distances, usually at every second stage, what is called a Crown post-house, with the same arrangements and objects in view which we have already had occasion to describe (see p. 21). It is only where the Sclavonian population is often interrupted, and where strange tribes are, throughout extensive tracts, the only inhabitants on the road side, that it is thought

necessary to establish such means of accommodation. Hitherto, the money to be paid by the traveller was taken in every village by the elder (Stárosta), and only at wide intervals was there also found a superintending officer, who noted the number of travellers and the number of horses they required; but henceforth each conductor or driver gave a statement of the sum due to him to his successor, until at length, some place with a public establishment being arrived at, the officer received the money and divided it among the various claimants.

From this point onward, also, care seems to be taken to provide accommodation for travellers in the public post-houses; which shows that the want of such accommodation was very sensibly felt, for Russian travellers, in general, cannot easily bring themselves to lodge with people of a different creed. In the village of Polăna, where we spent this night, we saw directly opposite to the Crown post-house another large public building of equal size. This second building, which we observed here for the first time, proved on the remainder of the road a constant companion of the post-house. It was divided into numerous quadrangular chambers, side by side; the wooden walls being coloured yellow, and the roof reddened with ochre. Being surrounded with a fence of palisades, these houses bear the name of Ostrog, a barricade or fort, and are intended for the reception and lodging of convicts on their way to Siberia. It is indeed on this part of the road that trains of convicts on their march are first met with. It would appear that those who, in the western parts of the empire, are condemned to exile, are sent separately to Nijnei Novgorod, and there first they meet together on the great road to Siberia, to pursue their common journey.

Aug. 10.—We travelled to-day seventy-five versts to the village of Chugúnui, the road going through a

good arable country and well built villages with a Russian population. In the Ostrog at Ostashíkha (50 versts from Polăna) a troop of exiles was halting for a day. There were ten women among them, who showed themselves at the barred windows of their lodging, and, if we were to judge from their boisterous mirth, they were neither dissatisfied with their past journey nor troubled with care about their future destiny.

We saw the convicts condemned to exile provided here, generally speaking, when about to start on their march, with uniform linen clothing at the public charge. With every train of them, are several waggons drawn by post-horses to carry the women and the old and infirm men: the rest follow in pairs, in a long train, after the waggons, escorted by a militia established in the villages. It is but rarely that one sees especial offenders with fetters on their legs during the march.

At Ostashíkha the spring water is about ninety-eight feet below the surface of the ground. The elevation of that place above the level of the Volga, must therefore be as much, but is probably something more. In a well sunk in the yard of the post-house, to the depth above mentioned, I found the temperature of the water to be 5° R. In the subsequent course of our journey to the Uralian mountains, I frequently observed the temperature of the water collected in similar deep shafts, and thus arrived at the conviction that they indicate the temperature of the earth nearly as well as running springs.

Aug. 11. — On the way from Chugúnui to Sundúrsk (ninety-four versts) the hitherto uniform character of the landscape undergoes a sudden change. From Chugúnui the ground falls, at first gradually, afterwards more rapidly, till it comes almost to the level of the Volga, and spreads into an even plain clothed in the richest green. This depression, which

crosses the elevated plateau on the right bank of the river, extends towards the east only three or four miles to a range of hills, along the feet of which flows the Sura till it joins the Volga. On the right bank of this great tributary, near its mouth, stands the exceedingly pretty little town of Vasili Sursk. The houses are picturesquely scattered over a varying slope which begins about forty feet above the river and are surrounded by ancient and lofty oaks: the opposite banks of the Sura are still covered with low willows.

The navigation of the river contributes not a little to the animation of this place. In the stream lay a number of the boats which carry grain. Numerous cranes along the water-side for loading the vessels, show that this important traffic in some measure begins here. The fisheries of the Sura are also productive, and here for the first time we were served with the sterled, which, of all fish, is considered by the Russians as the greatest treat. This is the only species of sturgeon which ascends from the Caspian Sea into the tributaries of the Volga. The sturgeon here taken are kept in great tanks near the houses, until an opportunity is found of sending them alive, by boat up the Volga, to the capital.

The manners of the flourishing commercial town not far off, have been communicated in some degree to the inhabitants of Vasil, for in the middle of the little town is a tavern, where the principal burghers and the more wealthy of the country people in the vicinity meet together. The former of these adhere strictly to the old-fashioned national costume—the kaftân or upper garment richly braided. The tavern was well provided both in the larder and the cellar; with other wines, those of the Don too had already come into vogue. The view from the balconies of this house, which stands high, is quite charming. Numerous sandy islands, formed in the Volga before

the mouth of the Sura, have the effect of spreading the water over a wider area, and even in the driest part of the summer it looked as if the latter river were discharging itself into a distant arm of the sea.

Beyond the town the road still ascends rapidly, and the tongue of land, between the right bank of the Sura and the left of the Volga, rises in still bolder contrast with the low plains on the opposite side, than the similarly placed tract at Novgorod between the Volga and the Oka. On the summit of this table land, the oaks are as frequent and as well grown as in the vicinity of Vasil, and this circumstance alone gave the character of the landscape here a great advantage over that of the country already travelled through.

The Sura forms an ethnographical limit also, for in the country beyond it, the Cheremisses, and further eastwards, the Chuvashes, still keep their place as the prevailing population. The contemporaneous and almost sudden appearance of the oak forests and of this aboriginal population is surely not without some dependence of the one on the other; and in fact, in all that we have seen of the Nijegorod government, as well as on other parts of the road from St. Petersburg to the Sura, the extirpation of the timber (the pine kind excepted) has been the consequence of the increase of an agricultural population. Even here, in the neighbourhood of a few settlements, the Cheremissian inhabitants of which are gradually acquiring industrious habits, and cultivate the soil more or less, the oak woods are already exterminated; but between those villages, the forest retains its ancient grandeur.

At the next station—Ernuingash—the post-house stands in the midst of low wooden huts inhabited by Cheremisses. These aboriginal possessors of the land are, externally, as different as possible from the Russian peasants. Their clothing, which is exactly

the same for both sexes, consists of white linen trousers, and of an upper garment or smock of like material and colour, fastened with a girdle round the hips. This smock is generally ornamented with embroidery in several colours on the breast and shoulders. On the other hand, the strips of cloth which they wind round the leg, in the Russian manner, from the foot to the knee, are always black. Their embroidery closely resembles in its patterns that usual among the Mordvi, but with this difference, that the latter mix black figures with the others; whereas the Cheremisses show a decided preference for red and light blue. In their persons, the Cheremisses are much smaller and weaker than the Russians and the Mordvi. They allow their long black hair to hang about them in the wildest disorder, and in this respect there is no distinction between men and women, for it was only rarely, and on solemn occasions, that we saw the latter with their locks collected under a lofty pyramidal kind of hat. A peculiar shiness, manifest both in their physiognomy and demeanour, forms the chief characteristic of this people.

The postmaster at Ernuingash told us, that in his neighbourhood the people clung obstinately to their ancient religious usages, and offered to the evil gods bloody sacrifices, chiefly horses, horned cattle and sheep, always in a consecrated spot in the wood, which they called *Kremet*. To the benevolent deities, on the other hand, they did homage in the open plain, and thought that they were best pleased with offerings of vegetables, fruits and flowers. They appear to devote themselves to tillage with more zeal than success; near the village we saw some harrows, drawn partly by lean horses, partly by women. Near Ernuingash we crossed the bounds between the government of Nijegorod and that of Kasan.

At Bieloi Vrag, twenty-five versts from Ernuingash,

are only a few Cheremissian huts scattered over the green hills, beneath the tall remnants of the ancient wood. Here only a few of the inhabitants could speak some broken Russian; the aboriginal tongue still retains its predominance, and even the Russians living in the neighbourhood learn to speak it fluently betimes for the purpose of intercourse. The strong accentuation of the Cheremisses, and the acute tone of their voice, give their speech an appearance of lively emotion. The name *Bieloi Vrag* signifies a *white enemy*, and may possibly preserve the memory of some distinguishing epithet given by the Russian conquerors to the Cheremisses on account of their white clothing. Perhaps the latter, favoured here by the military advantages of the ground, struggled more obstinately in defence of their native homes.

From this place we proceeded, as the dusk commenced, through an exceedingly thick oak forest, in which watch fires, every three or four miles, surrounded by the white figures of the Cheremisses, had a wild and romantic effect. These were posts of guards waiting for the trains of exiles, in order to escort them in succession.

We spent the night at Sundùrsk, where, in an open spot in the forest, we found the dwelling of an inspector of the post, surrounded by Chuvashian huts. Here another language takes the place of the Cheremissian, which had prevailed along the road for a distance of only eight geographical miles. And here too the Tarakane, or black beetle, seems to have followed the Russian settlements.

Aug. 12.—We travelled from Sundùrsk to Anchikóvo, seventy-five versts. The upper garment of the Chuvashes closely resembles that of the Cheremisses, yet with the women to-day we saw more of distinctive ornament than was discernible in the dress of the Cheremissian ladies. They wore, for instance, a plate

of sheet copper hanging from the girdle backwards over the hips, which, being strung with all kinds of metallic ornaments, made, in walking, a perpetual clatter. Others had, instead of the copper, only a similarly shaped piece of dark cloth, with fringed edges. A piece of cloth of like shape hangs down in front also from the girdle to the middle of the body. In reply to our inquiries, they told us that all the women, married and unmarried, without distinction, wear this singular piece of dress. They call it *Schüre*. Remarkably enough, this expression reminds one of the German root *schurz*, which was originally used in a similar way to signify a covering of the middle part of the body. In the Sclavonian languages, there is no corresponding root.

One of the postillions who drove us from Sundùrsk, entertained us with a Chuvashian song, in which the words

Hinga Hinga Formanäï
Hinga Hinga Pustatäï

were very distinguishable as a continually returning burden. We did not succeed in learning its meaning from the singer, who could hardly make himself intelligible in Russian. On that account, also, my endeavour to obtain from him a vocabulary of his language resulted only in procuring the following scanty specimen:

	Russian.	*Chuvashian.*
A maid	Jévushka	Khir.
woman	Jénshchina	Arm.
boy	Málchik	Acha.
horse	Lóshad	Loja.
mare	Kobúila	Kissra.
Give me to drink	Davaï pity	Kirmetcha shuyäs mana.
Give me to eat	Davaï kúshity	Shuyäs kelen min.

As far as the neighbourhood of the town of Cheboksar, fine oak woods continue with little interruption; but there the hilly land is again used for tillage,

and behind the houses of the Russian inhabitants may be seen well cultivated kitchen gardens. The houses of this place, which is considerable, stand partly within a wide glen, partly on the slope of the hills which confine it. In the lower part of the town is a commercial hall, always open for business, and in the open ground before it was held a market, thronged at the time with Chuvashes.

The country here is hilly, and roundish summits of greater height are continually seen rising in the distance. At Akasíne, a stage sixty-nine versts from Sundùrsk, hard strata of marl show themselves on the steep banks of a rivulet running into the Volga; and here also lay, carried down from no great distance, large blocks of a very handsome compact gypsum, which was traversed by veins of fibrous gypsum, inclosing masses of bluish chalcedony with a noduled surface, like clusters of grapes. In the course of this day's journey, we frequently met waggons laden with cotton, each batch having a single Bokharian attendant together with the Tatars of Kasan, who had engaged to furnish the horses and to carry the goods to Nijnei.

At Anchikóvo, where in the evening I was busy making the usual observations of the stars for the determination of the magnetic declination, the novel sight of the instruments brought together a crowd of wondering Chuvashes. The striking timidity of this people, and their proneness to take alarm, were here fully proved; for the instant that something was uttered on our side, a little louder by accident than usual, they took to their heels with signs of great terror and never came near us again. The women were particularly careful to keep at a safe distance, and we saw them in the evening making great circuits so as to avoid coming near the strangers on their way back from the fields. All the accounts of the first occupation

of this country mention the timidity of the natives; but it is extraordinary that they should still retain this characteristic after so many years' intercourse with the Russians.

The next morning, (August 13), we had for the first time an opportunity of becoming more closely acquainted with the looks and costume of the Chuvashian women; we saw a number of young girls setting off on horseback from the village, probably to gather wild berries or to execute some similar task of rural economy in the neighbouring wood. They rode without stirrups; and a woilok, or piece of soft felt, supplied the place of a saddle.

They all wore a handsome piece of headdress which we had not seen before; it was a round cap on which were sewed, as thick as possible, Russian silver coins, and the part of the gown which lay over the breast was adorned in the same way. This portion of their apparel, as well as the metal ornaments fastened to the girdle behind, rattled loudly while the ladies trotted at a good rate along the beaten road. Our attention seemed to increase their speed, and one of the party having fallen from her horse near the village, the others made the greatest exertions to replace her quickly in her seat, looking round most anxiously at the same time to see whether we were approaching.

From Anchikóvo we travelled to Kasan, a distance of sixty-one versts. We arrived in the little Russian town of Svăjik, just as a procession of the priests and other inhabitants was taking place by way of a preparation for the festival of the Transfiguration. They seemed to be very strict in this place in enforcing respect to the religion of the country; for the Norwegian servant of our party, who had approached the procession without making the usual reverence, was immediately arrested; and as he could not speak a word of Russian, it was some time before he could

be allowed to return to his party, when an explanation took place and the matter was cleared up.

In the town, and still more in its immediate vicinity, the Tatars live in preponderating numbers. Hence their language is here very zealously studied by the Russians. We found a Russian boy in Svăjik studying a Tatar grammar in the Russian language, printed in Kasan, and used there in the elementary schools.

Immediately behind the town the great road turns to the north, without touching on the river Svăja which flows eastwards. The hills (Bugórki) on the right bank of the Volga, now continually sink, and the bed of the river is here further removed from the ridges on both sides, than was the case with that part of the Volga's course which we had seen further towards the north-west. The approach to the great stream which we crossed by a ferry (above the mouth of the Svăja) was announced at some distance by a broad tract of sand.

At the landing place by the ferry, we found a number of Tatars, who, with their single-horsed light waggons, were waiting for the ferry boat, and were endeavouring to turn the time to account in a variety of occupations. Some were bathing, some washing, some cooking, according to their several wants: the most of these waggons were returning home empty, having been engaged in carrying goods to Nijnei Novgorod.

It was a long time before they carried over the heavier part of our carriage; for the first boat that arrived was only calculated to bear the usual light waggon of the country, but the other and larger vessel was employed at the same time in the pressing business of the Tatar caravans. The current of the Volga is here very moderate, so that a few oars sufficed to manage the ferry boat.

On the left bank we meet, in the first place, with a tract of low ground, thickly covered with willow bushes; and which, being covered with mud and slime, bears the clearest traces of annual inundation, and accordingly, like other similar places in the government of Nijegorod, it is called *lugovoi béreg*, or willow bank. Towards the east are to be seen great pools or lakes, which are united, during the floods, with the waters of the Volga.

Yet just beyond the post-house of Kusemétyeva, (in a straight line hardly a mile from the Volga,) the oak woods begin again, and continue for about seven miles, where at length the towers of Kasan are seen rising on the open plain. Westward of the town, the land is in general very industriously cultivated. In the middle of the plain, near the road, is a stone chapel, which contains, as our driver assured us, the bones of the Russian warriors who fell at the taking of Kasan.

Aug. 14. *&* 15. — The chief buildings of Kasan encircle the elevated tongue of land, which, rising like an island above low plains, generally liable to inundation, stands between the left bank of the little river Kasanka, and the still smaller stream, the Bulak, which joins the preceding. Close to the steepest part of the bank lies the fort, or kreml, which is still surrounded by the stone wall built by the Tatars. On the side towards the land, also, this projecting hill has been cut away so steep that one might easily suppose the artificial declivity to be a natural precipice, particularly as the hollows beneath are in spring often filled with water. The floods of the Volga not only drive back the current of the Kasanka, but force the water of this river to quit entirely its usual bed.

Down the river the hill sinks gradually, and is skirted by the principal buildings of the middle town,

most of which lay claim to considerable antiquity; then follow the lower streets along the Bulak. This lower part of the town is not paved, and is frequently covered with water, so that dry footing is only to be found on the logway close to the houses. From the higher points of the town the country immediately around had now, in summer, a very pleasing appearance. Gardens and meadows of the richest green extend down in every direction to the arms of the river, which intersect as if with a net the distant parts of the plain, and reflect a dazzling light when the sun is low.

From the middle town a wide gate gives access to the fortress. Within this are to be seen, besides the ruins of Tatar edifices, very solidly constructed of brick, the barracks of the Russian troops now stationed here, the prisons and workhouses for the criminals, besides the Palladium of the place, the Cathedral of the Kasan Mother-of-God. The holy picture kept here is held, like similar ones at Kiev and other old towns of the empire, in the highest esteem and reverence by the faithful, owing to the early invention and propagation of tales of their miraculous discovery and preservation. A holiday is set apart for such likenesses, and particularly for the one in question. In many places throughout the empire, churches have been built for the invocation of the Kasan Mother-of-God, and copies set up in them, as faithful as possible, and, consequently, endued with the miraculous powers of the original picture. In the original, which is to be seen here, the rich and fantastic ornaments of the drapery, wrought in metal, and set with precious stones, are far more remarkable than the faded and inartistic painting.

In the part of the middle town which adjoins the fortress, one may recognise in the great size of the

Bazaar, or Gostini dvor, and in the grand appearance of some private houses near it, the high rank which Kasan held at an early period among the most important cities of the empire. Many of the old churches display a great deal of architectural painstaking, and some of them may perhaps even excel those of Moscow, in elaborate execution. The market-place, which is surrounded by lofty buildings, for the most part of stone, has been recently much improved in appearance by the planting of rows of trees.

In the lower town is a long row of houses occupied chiefly by the opulent merchants, and separated from one another by gardens. Next to that comes the University, which does not yield to similar institutions in the capital in the elegance and dignity of its exterior. It is built of white hewn stone, and the principal fronts are adorned with Corinthian columns. So that, generally speaking, in the appearance of its ancient as well as of its modern quarters, Kasan is nowise inferior to the greater towns in the centre of the empire.

We were led to make a close acquaintance with the Bazaar by our wants, for we were counselled universally to provide ourselves at Kasan with furs, since further on there was no place which we could expect to reach before the commencement of the winter's cold, where there was so large an assortment to choose from.

In truth, one is amazed at the prodigious quantity of skins, which are piled up, one upon the other, in the fur stalls of the Gostini dvor, for, during the continuance of the warm weather, nothing less than the universal assurance of the inhabitants can persuade one that, two months hence, not a soul here can dispense with this article of dress, which is hardly known in Western Europe; and that we are

already in the country in which (as the ancient Greeks expressed it) every man takes for a time the figure of a beast.

For the lighter fur dress, which is universally known in Russia by the Tatar name tulùp, the people in this place usually choose the fine fleece of the Kirgiz sheep. These fleeces are partly bought up by itinerant Russian dealers in the camps of the nomades in the government of Orenburg, and partly brought by the Kirgizes to the markets of Orenburg and Troitsk. The black skins are much dearer than the white, being covered with a longer, sleeker, and more lasting wool, while the white fleece is thin and crisped.

The perfectly protecting fur dress, which is used for long continuance in the open air, is called shúba. Wolves' skins are here most in use for this purpose, and those particularly from the northern parts of the government of Yenisei, and known to dealers by the name of Turukhansk skins, are highly prized.

But here, on the very threshold of Siberia, there is a great accumulation of the most costly productions of the Siberian hunter's toil; and these are used in general to ornament fur garments, merely as a bordering. But the wealthy get pelisses made altogether of the dearest fox skins, or of the still more expensive light skins of very young bears, which are perfectly black throughout.

The furry side of the pelisse is here always worn turned in towards the body; and it is considered indispensable that the other side of the skin, which is turned outwards, should have an artificial covering of some kind (linen or cotton is used by the common people), so as to protect it from damp, which is injurious to every kind of peltry.

We saw here, also, in much greater variety and abundance than in any place previously visited, dried

fruits and vegetable productions, which are brought to Orenburg by the caravans from Bokhara, and from thence are sent into Siberia and to this place, a small portion only reaching the markets further westwards.

Under the Bokharian names, which are at times, however, a little disfigured, are to be bought in the bazaar of Kasan dried apricots (Urŭk), the soft coats of which and the interior pulp are equally agreeable. The coat or skin is very sweet, and in the dried state is from four to six lines thick. The almond of the kernel, also, is perfectly sweet: its woody receptacle is at the same time as smooth, hard, and of the same figure, as that of the apricot cultivated in Europe. It seems, therefore, as if certain modes of culture could suffice to remove the prussic acid and the bitterness from the almonds of many stone fruits, and to make them eatable; just as the influence of cultivation appears to have created the difference between the bitter and sweet varieties of the common almond; for in Cato's time the Romans were acquainted only with the bitter kind, and it was not till a later period that the sweet variety was imported into Italy under the name of Greek nuts. Now both kinds are cultivated in the same places.

Here also may be found, under the name of Kishmish, dried grapes, of a kind wholly without seeds. Raisins made from grapes of the ordinary kinds of vine bear here the common Russian name of *isùm*, which is also used by the Tatars, in whose language *usùm* still means a grape. In like manner the dried plums imported by the Bokharians are called by the Russian name (slivi); that fruit being already well known from other sources.

But the Pistashi, as they are called, or else Fistashi, (Pistachio nuts) bear the Bokharian name. These are pear-shaped seeds, or what botanists would call

Drupæ, about six lines in length and two or three lines broad at the widest part, with close-fitting, yellow, parchment-like covers, and with an oily split kernel, of bright green colour.

These Pistachio nuts are usually bought here in Kasan, together with a yellowish manna, which is doubtless produced in large quantities by the plant itself; for the pear-shaped seeds are found often enough enclosed in the indurated manna, or glued together by it; so that it is obvious that both productions, the manna and the seed, were picked up at the same time from the ground at the foot of the tree. Dried dates too (in Russian *finik*) are sure to be found among the Bokharian fruits.

The Bokharians sell the pood of urúk to the Russian traders for sixty-five roobles, that is to say, one pound for about one shilling and five pence; the other fruits usually cost twenty-five roobles the pood, or seven pence the pound.

Here, too, these and other sweet vegetable productions are much in favour with the Russian people; and perhaps a general ground for that partiality which they evince to fruit, and which has been so often referred to, may be found in the circumstance that, during the long and strict fasts which they are obliged to keep even in winter, it allows them an agreeable change with the ordinary fish diet. In summer the vegetable food of the inhabitants of Kasan is extremely various and abundant. Not only do all kinds of bread corn, from spelt, which is sensitive as to climate, and wheat down to the hardier barley, grow well in the fields, but the gardens also produce potatoes, peas, turnips and cabbage, gherkins and pumpkins in great plenty; while the Kirgiz and Russians inhabiting the country to the south, bring to the market a large supply of sweet melons (Cucumis Melo; in Russian, Dina); and a still larger of water melons

(Cucurbita citrallus; Russian, Arbus). This last-mentioned extraordinarily juicy and cooling fruit lies in great heaps in the market, and being sold for next to nothing, it affords to the poorer classes a grateful as well as wholesome nutriment.

The great supply of fish which is sent to Kasan from the provinces bordering on the Volga likewise contributes not a little to satisfy the wants of the labouring population. Here we saw for the first time, besides the well-known Black Caviar, as it is called, of the sturgeon, the White Caviar also, prepared from the roe of the pike and salmon. And it may be observed, that the name given to this dainty throughout the West of Europe, and which, it is well known, was first applied to it in Italy where the article was imported, is as little used in Kasan as in the rest of Russia, and the name ordinarily given to it is *Ikrá*, which originally signifies only the roe of the fish in its raw state.

As the country is rich in produce, so the town of Kasan also has, together with the usual branches of manufacturing industry, some which are peculiar to itself. One of these is the preparation and staining of Russia leather; a business in which the Tatars settled in Kasan are actively engaged: another is the making of a favourite kind of soap (múclo), which cut into small pieces, and packed in coarsely painted wooden boxes, is sent all over Russia.

The use of this, or some similar cosmetic appliances, among the aboriginal occupants of Southern Russia, is likely to have been occasioned, as it certainly was favoured, by the great abundance of alkaline plants which spring up in the steppes of that country. Herodotus speaks only of a very remarkable substitute for soap used by the Scythian women, when he tells us that they plastered their faces and bodies with a soft paste made of the shavings of a par-

ticular kind of wood, and stripped it off again when it was quite dry, by which means they completely cleansed the skin. This seems to have been only a process for promoting absorption, like that which is used to extirpate freckles; but, according to the testimony of the historian Nestor, the heathen Sclavonians, in the middle of Russia, made use of a cleansing lye or alkaline solution, as early as the fiftieth year of the Christian era; for when the apostle Andrew returned to Rome from his missionary journey into Russia, as it is assumed, he is said to have described the vapour baths of the people, and to have used these words: "They pour lye (Mitely) upon themselves, and then they begin to brush and scrub themselves with the twigs of trees." Now, though the truth of this whole story of the missionary journey might be reasonably questioned, yet Nestor's statement proves, nevertheless, the great antiquity of the usage mentioned in it; for otherwise the old historian would never have selected this very custom as the one which characterised the Sclavonians at that time, and as a mark whereby they could be recognised infallibly. At a later date, we find it stated that some Russians from Siberia, who were carried off into captivity by the Chinese, grew into great favour with this people by teaching them how to make soap.

Many of the inhabitants of Kasan carry on with great profit the factor's business of purchasing and transmitting goods; for the place has for this purpose a favourable situation, being on the borders of two regions, so constituted by nature that they can mutually complete each other's riches by interchanging productions. The manufactures of the European artisan, in all their endless variety, are easily brought to this place, and not far off is Northern Asia, the inhabitants of which are always ready to barter the riches which nature lavishes on them for the most

trifling productions of industry. In this quarter, therefore, mercantile travelling, after the old fashion, is far more profitable to him who ventures on it than in Western Russia; because great differences in the value of the goods to be bartered are to be found even within the limits where travelling is easy. The trade in Chinese tea is a source of great wealth to the merchants of Kasan; but that trade does not consist in purchasing the tea directly and at once, with money: the acquisition of the Chinese product usually concludes a long and complicated system of barter, the course of which can be learned only in the interior of Siberia, where it is carried on. In the individuals here who are enriched by trade may be observed the same fundamental principles with respect to their frugal enjoyments, the same decided propensity for the ancient and rude simplicity of manners, as is manifested in St. Petersburg by those in the same condition of life. In general the most expensive articles in their houses are richly ornamented images of saints; and it is only on plants, or on well-kept gardens and conservatories, that they will cheerfully expend considerable sums.

It was certainly a judicious choice which erected a city favoured by the fertility of the surrounding country, by industry and commerce, into a school also of modern civilisation; and the success of the University of Kasan seems to correspond fully with the wise and liberal views which regulated its foundation.

The study of the national history is encouraged there, not only by the character of the university library, but also by a remarkably rich collection of Russian and Tatar coins — a most important monument of the past. The study of the Eastern languages also is carried on at the very sources, and

many of the students are stimulated by practical necessity, as well as by the thirst of knowledge.

In respect to the natural sciences, descriptive as well as mathematical, the teachers, who are themselves eminent men, have apparatus and collections placed at their disposal which are worthy of them. Professor Eversmann gives up disinterestedly to the use of the university the rich collections made by him in the course of his extensive travels. The Observatory is well furnished with instruments, and recently there has been purchased for it a meridian circle by Reichenbach, which, even in the centre of European civilisation, might still pass for a rarity.

In the midst of all these European institutions, the peculiarities of the original Asiatic inhabitants still remain undisturbed. In the streets it is easy to distinguish the Tatars from the Russians; for even when employed in driving waggons or in other occupations, and not wearing their peculiar outer garment (Khalat), they are yet recognisable by the dark colour of their lean, muscular, and, as it were, angular visage; by the close-fitting cap, which always covers the closely-shaved skull, and by a certain smartness of gait and demeanour. Many of them, as well as the Bokharians settled in the place, offer for sale in the streets, or carry about to the houses, cheap Asiatic manufactures, particularly articles of clothing. They dwell quite apart from the Russian inhabitants.

The southern quarters of the town consist, for the most part, of wooden houses of a single story, occupied by Russian mechanics, the great majority of whom are smiths and wheelwrights. These streets border on a broad hollow, in the middle of which runs the Bulak, at present a small stream. In spring this hollow is all covered with water, and even now it is a quagmire, unsafe to tread on, and is crossed only in certain places by means of planks. Beyond

this, we arrive at the banks of the smaller lake Kaban, at the place where the Bulak quits it and turns north-westward to the Kasanka.

On the pretty hills which encircle this lake, the Tatars have maintained a populous settlement. We visited them towards sunset, and received permission to be present at the evening worship, which was about to commence in the great Mesjid or mosque. The approach to the portico of the sacred edifice is by a few steps, which were fenced round by walls and a wooden paling. We entered first into a wide quadrangular hall: along the walls are placed rows of tall grave-stones, dug up in the vicinity, and set up here to perpetuate the memory of some saintly characters. The Tatars, as they came in, stood for a little time in silent prayer before these stones. Each left his shoes at the door of the circular hall adjoining, and proceeded barefooted to its eastern wall, where he squatted down, with his legs under him, on the mats which cover the floor of the extremely simple and unadorned edifice. The people, thus forming a semicircle facing the west, sat as motionless as statues, which they resembled the more on account of their white clothing, the narrow windows giving entrance to only a few faint rays of the evening light. The priest in the mean time had seated himself on the ground, at the western side of the hall; and, with his face to the congregation, he now began to read verses from the Koran, in a chanting sonorous voice, and with rhythmical cadence. When the verses were read, the hearers bowed their heads to the ground, and a dead silence reigned during the silent prayer. Readings and pauses were in this way repeated several times, until at the conclusion of a prayer, the priest rose, and addressing our guide begged us to leave the Mesjid, as the presence of unbelievers could not be allowed during the rest of the

service. The great simplicity of this ceremony, and the enthusiastic profound piety expressed by the priest's mode of recitation, and still more by the demeanour of his hearers, could not fail to make a deep impression on the mind of the candid spectator.

On our way back we met with several Tatars who were now only going to the Mesjid. They were distinguished by several peculiarities of dress, having their heads enveloped with a large complicated white turban, like that of the Ottomans, and each of them had a long staff, which is the distinction, as our guide informed us, of those who have made distant pilgrimages.

The houses of the Tatar town are small and unadorned, like those of Russian villages, constructed of rough logs, without exterior planking. But in their internal arrangements they differ from the Russian cabins; they have, for example, always window curtains, behind which the women are careful to conceal themselves when any one passes by. Close to the lake, in front of the town, we passed by some women hastening to the water, where a number of them were already busily employed in washing clothes. They all wore white linen gowns, which differed from those of the Cheremissian women, in being made with more ample folds, but particularly by the long veil, which, being attached to the upper part of the gown behind, serves as a hood. The light and timid step of these women recalled to mind in a lively manner the words of the poet, who has so profoundly seized on the characteristics of Tatar life;

> In ample folds of snowy white conceal'd
> The Tatar maiden swiftly glides along,
> Like morning mists when flying o'er the field
> Noiseless and bright .

* Pushkin, in his poem entitled "The Fountains of Bakchisarài."

For the purposes of cleanliness, as required by their religion, the Tatars have constructed a great number of wooden jetties, at a little height above the water, and on these they perform the ablutions which must precede their often repeated prayers.

The peculiarities, so perfectly preserved, of the Tatars in this place, awaken within us an involuntary interest respecting the fate of their forefathers; and we therefore learn with pleasure the accurate information, collected as early as 1778, by Grigóry Stepánovich Surovzof (at that time professor in the University), respecting the conquest of Kasan by the Russians, which is the grand crisis of the history of two neighbouring nations. Guided by these historical inquiries, the poet Kheráskof too has described this memorable event in his epic entitled "Rosiáda."

Kasan had been already three times totally changed as to external appearance by conflagrations which took place within the first century of Russian sovereignty, (from the year 1552,) when in 1774 another fire destroyed also the ancient archives of the place, and rendered inquiries into its original condition and fortunes apparently impossible. Yet the zealous researches of Surovzov, directed only after original documents, succeeded in making good the apparent loss. Chronicles, contemporaneous with the taking of the place, were found in several of the neighbouring monasteries, and these writings were compared by the diligent historian with one another, as well as with monuments of another kind. His critical caution made him mistrust the fanciful tales which were current among the Tatars, but he got the oldest of these people to point out to him the spots where the remains of towers or gates, or other vestiges of the ancient city, were still traceable in their early days.

Another and fuller evidence to the same effect, was offered by a church solemnity, which by yearly re-

petition had been preserved unchanged from the middle of the sixteenth century, down to the time when these researches were commenced. A few years after the conquerors had settled in Kasan, the place was visited by a dreadful pestilence. Recourse was had, as usual, to the saints, and it was ordered that the image of the Smolensko Mother-of-God should be taken from the neighbouring convent of the Seven Seas, and be carried round the walls of the city as they then stood, the liturgy being repeated at every gate. This order was obeyed with unfailing punctuality for centuries, and excavations proved, that in the procession of 1778, the halts were made only at the places where the gates of the town had formerly stood.

The extent of the old Tatar city was hardly less than that of Kasan at the present day. It stretched along the Bulak, from its mouth nearly two miles to the south, almost to the little Kaban lake, and its diameter along the Kasanka was of equal length. The walls round the town measured in thickness twenty-eight feet, and were formed of two parallel wooden fences twenty-five feet asunder, and having the space between them filled up with stones and clay. The wooden fences, as well as the towers over the gates, were formed of oak timbers of extraordinary thickness. The gates, with their towers, were thirteen in number, those which were due east and west leading directly into the Kreml.

How this haughty and apparently strong city, in spite of all its fortifications, was obliged to submit to the Russian arms, is related most circumstantially by the chronicles. On the 23d of August, 1552, the Tsar Joan Vasilievich came with a numerous army to Sväjik; on the 28th he crossed the Volga; and on the 30th established his camp at the mouth and along the right bank of the Kasanka. Sheikh Ali, a ruler

who had been deposed by the people of Kasan, had gone forward to meet the Tsar, and concluded a league with him on the way. The same chief, attended by some Russian captains, descended the Volga with provisions and guns, which he succeeded in landing safely a couple of miles below the mouth of the Kasanka. The Mirza Kamài also, and seven other deserters from Kasan, joined the Tsar, and gave intelligence calculated to hasten the ruin of their nation. They disclosed the plans of defence adopted by Yediger, who was at that time ruler of Kasan.

The main body of the army then advanced along the left bank of the Kasanka; and in the fields, called the Tsar's Meadows, they found the heavy cannon which had been brought down the river. The boats, however, which were laden with the provisions, foundered in a storm, and the assailants had to endure, in consequence, some severe privations.

The army being divided into two bodies, one of them, under the Tsar, invested the town from the west, round by the north to the north-east; while the other, under Skeikh Ali, making a wide circuit round the south side of Kasan, hastened to occupy the road to Arsk, for it was known that the neighbouring Tatars on that side were on their way to succour the city. In fact, there were already 30,000 men concealed along this road: these fell upon the Russians, who had also to repel sallies, and bear a brisk cannonade from the town. Yet the latter remained masters of the field. From that time the attacks on the walls commenced, and a detachment of the army was sent to Arsk to liberate the Christian captives, who, in previous wars, had fallen into the hands of the Tatars of that place.

The chronicles relate with much detail, how for forty days the victory still seemed doubtful, and how the Russian cavalry were engaged in repelling the

attacks of the Meadowland-Cheremisses who hastened to the relief of the Tatars. But one or two incidents which seem to exhibit the besieged in a characteristic light are better worthy of our notice.

The Russian warriors who were stationed in the trenches without tents, suffered much from the constant heavy rains; and this annoyance was universally ascribed to the arts of the Tatar queen Sumbyéka, who was celebrated as an enchantress, and to the subordinate *koldúni*, or sorcerers of the city.

During the siege the streets of Kasan were dreary and desolate; for the inhabitants who were not employed on the walls, withdrew into the cellars and caves, which had been constructed in all the open courts, in case of such disasters. The besieged showed the most obstinate determination. Many of their number had fallen into the hands of the Russians, and were fastened by these to the palisades in front of the attacking line, in order to move the compassion of the besieged, and induce them to surrender the place. But the citizens, firing at the captives from the walls, called out by way of reply, "No citizen of Kasan will outlive his freedom."

But after all, the taking of the place would hardly have been effected, had it not been for the arts of an experienced engineer, who, under the title of Rosmúisl, or inventor (the translation of the Latin term "ingeniator," at that time generally used in Europe), happened to be with the Russian army. A vaulted brick gallery led from the Kreml down to the Kasanka, and through this was obtained the necessary supply of water, the Russian artillery forbidding approach to most parts of the river. It took twenty days to complete three subterranean galleries, one of which undermined the above mentioned vaulted passage; another led to the powder magazine in the heart of the Kreml; and the third terminated in like manner

beneath the dwelling of the ruler of Kasan. When the mines were complete and charged with powder, the besieging army mustered in the plain towards Arsk. Divine service was begun, and as the priest uttered the words, "a flock only shall be his, and a shepherd," the mines exploded, and two towers of the Kreml, with a part of the town walls, lay in ruins.

In the streets of Kasan every step forward was bought with blood. The Tatars had already fallen in thousands, when in front of a Mesjid in the Kreml, a band of priests, led by their chief, or Kúl-sherif-Mullah, fell suddenly on the Russians. A new combat of the fiercest kind now began, and it was only over the dead bodies of the priests, that the victors at length arrived near the dwelling of the ruler. There stood Yediger, with a band of faithful adherents; but on the opposite side he had placed, in the hope of corrupting the enemy, a thousand of the most beautiful young women, in the gayest apparel. But these temptations failed to change the purpose of the Russian army; and the adherents of the Tatar prince fought long and valiantly before they could effect their escape from the Kreml, to a ford on the right bank of the Kasanka. But there they encountered a resistance which it was vain to contend with. They surrendered Yediger into the hands of the Russians, exclaiming, "Take our ruler, and treat him as befits his rank; but we die with arms in our hands." It happened as they said; not one of the warriors survived the fall of Kasan, and the independence of the nation terminated on the 12th of October, 1552.

All matters relating to the intercourse by post between Kasan and Tobolsk are under the management of one of the two General-Postmasters resident in those cities. On the part of the authorities here we experienced the most kind and hospitable exertions to further the objects of our journey. Thus, one of

those officers, who are in Russia called postillions, and whose ordinary business it is to forward letters and packages from one chief post-town to another adjacent one (as from Tobolsk to Kasan, from Kasan to Moskow, &c.), and to keep an eye on the couriers along the road, was assigned to us, as an attendant, as far as Tobolsk. This guard of honour or of protection was completely armed, as is usual, with pistols suspended from his breast, and with a sabre, so that the very sight of him was calculated to make us quake at the apprehended dangers of the ensuing part of our journey, of which dangers, nevertheless, we could never discover, in fact, the least symptom.

About noon on the 20th of August, we left Kasan, and passed with the usual speed through an open plain, which is in some places tilled. * The stations of Yanchúrino, twenty-five versts, and Churilin, forty-nine versts from Kasan, are inhabited by Tatars, who are chiefly occupied in agriculture and cattle breeding; yet it is generally remarked that refinement of manners and multiplication of wants make more progress with these people than with the Russian peasantry. Men and women here are neatly clothed. The smooth-shorn pate of the former, covered with the tight-fitting cap, and the precise cut of their beards, form a striking contrast with the savage head of hair, completely in a state of nature, which is usually worn by the Russians. Their houses are never without some good carpets and cushions to cover the seats and beds. It is only in the houses

* In the year 1785, as the members of Billing's expedition were passing over this part of their route, they travelled through a thick oak forest from the eighteenth to the fifty-second verst beyond Kasan; but on their return in 1794 this tract was already cleared of timber. At that time, as at present, the demands of the Baltic fleet caused great annual devastation in the oak woods of Kasan. Parties of seamen, under the command of naval officers, fell the timber, as near the Volga as possible, and float it, in rafts, up the river to the Neva.

that the women are to be seen. True to the universal national costume, they are always dressed in the loose white summer gowns. They never assist the men in yoking the horses or doing other coarse work, as is frequently witnessed in the Russian villages.

One never hears the Tatars utter those manifold and spiritedly personifying calls and exclamations which the Russian drivers make use of to cheer their horses or to caution them. The uniform cry, Aidá! takes the place of all that eloquence, and even this cry was more frequently addressed by our impatient Russian attendant to the driver, than by the latter to the horses.

CHAP. VII.

CHURILIN. — ARSK. — METYESHKA. — TATAR BURIAL-GROUND. — SYMPTOMS OF APPROACH TO THE URAL. — ROCK AT YANGUL. — MALMUISH. — GOLD FOUND HERE. — FOSSILS. — BEAR HUNTING. — RIVER VYATKA. — THE VOTYAKS. — HEIGHTS DETERMINED. — EFFECT OF FORESTS ON THE CLIMATE. — SURI. — IRON WORKS OF VOTKA. — CAST STEEL. — IJE. — HISTORY OF SOBAKIN. — MODE OF MAKING FIRE-ARMS. — MIXED POPULATION OF THE COUNTRY. — SOSNOVKA. — MIGRATION OF SERFS. — ROAD TO DUBROVA. — ELEVATION OF THE GROUND. — TORTUOUS COURSE OF THE KAMA. — DUBROVA. — OKHANSK.

At Churilin begin hills of considerable height, the rivulets among which run northwards into the bed of the Kasanka. The ground is rocky, and evidently of stratified formation; its character continues unchanged to the little Tatar town of Arsk, where we crossed, by a shallow ford, the rapid, but in this place still diminutive Kasanka: we then ascended through a glen to the heights of the right bank, on the declivity of which are scattered the wooden cabins of the inhabitants. The hills consist of a brilliant white slaty limestone, the strata of which are more inclined than any that we have observed since we left the south-eastern slope of the Valdaï range. In the village the people were employed driving in a very large flock of sheep, perhaps in order to slaughter them, and use their fleeces for winter clothing. Many of the men had already sheep-skin pelisses hung over their shoulders, and with a clear sky, the evening was extremely cool.

We spent the night in the imperial post-house, at the village of Metyeshka, sixty-seven versts from Kasan. Near it was a Tatar burial-ground, on the right side of the road. On every grave there is a rectangular chest, raised about four feet above the

ground, about the length of a man, and filled with earth. It is formed in the same manner as the dwelling houses, with rough-hewn posts laid one upon the other. The graves were in general parallel to one another, the longer sides lying nearly east and west.

August 21. — We travelled from Metyeshka to Melet, 91¾ versts. During the night, which was cloudless, a heavy dew had fallen on the fields round Metyeshka, and the temperature of the air near the ground had sunk at the same time to 4° R.

In the forenoon of to-day the sky was covered by the vapours rising from the ground; but afterwards during a few hours the temperature increased rapidly. The clouds, however, did not disappear completely till evening. The first part of our journey was through an umbrageous wood, of the richest green, into which I wandered a short distance, during a halt of our little caravan. The tall firs seemed here to be but sparingly interpolated among the leafy timber trees. Lime trees, of great height, were in full bloom; and with them were oaks of equally vigorous appearance, the buds of which were in many cases transformed into scaly nutgalls, by the sting of a Cynips. A kind of willow, with a great deal of down on the under side of its pale green oval leaves, which are from two to three inches long, formed a thick underwood. This willow is called by the Russians Iva, and is probably the Salix 11. of Gmelin's, Flor. Sibir; Sal. 811. Linnæi Flor. Suec. The rockberry, the well-flavoured fruit of which was now ripe, grew luxuriantly on the ground.

There is no object more interesting, or more calculated to engage the contemplation of a traveller, than a wood in its original wild state. It exhibits the productive powers of nature in its locality, and makes an impression on the spirit by setting them

visibly before our eyes. But this effect is increased when the products of spontaneous vegetation are sufficient, in their rude state, for all the wants of the frugal man: when we recognise in the wood the common storehouse for all the inhabitants of the surrounding country, whose houses are constructed of beams, or of boughs of trees, closed up with moss, while their coverlets, their cordage, and even their shoes, are made of lime bast; the wood-berries at the same time serving the rustic as a substitute for garden fruit.

The country here is somewhat hilly, and on the gentle slopes, facing generally the north-west, the wood was cleared away, and tillage took its place. The Tatars in this quarter seem to be careful husbandmen, for we saw their grain heaped up on wooden stages, so as to be secure from the humidity of the ground. Even here wheat still thrives perfectly. Thirty-six versts from Metyeshka, between the stations of Arbàsh and Yángul, we passed the bounds of the government of Kasan, and of that of Vyátka, which now begins. The forms of the hills in sight are invariably rounded, and never abrupt; but there is one remarkable feature in the inequalities of the surface which attracts notice, and that is, a frequently recurring line of strike of the valleys, perpendicular to the direction of the road, which leaves no doubt that we are already crossing the foremost of the Uralian heights. It was not, therefore, quite unexpectedly that we saw, at the entrance of the village of Yángul, thirty-one miles from Metyeshka, rock of the older formations, a deep-lying member of the stratified series. On the declivities of a roundish hill, stripped of wood, I found strata of a quartzose red sandstone, rich in mica, which at times had the closest resemblance to fine-grained granite. In some spots this rock has fallen to sand, in which are disseminated grains of

magnetic iron stone. A level tract then follows to Malmuish, 22 versts from Yángul, and here attention being again directed to the nature of the soil, we see the ground frequently covered with gravel of siliceous slate and quartz, resembling one of the older conglomerates in a state of disintegration.

Malmuish is now a Russian settlement, and is entitled, by its plan, and the arrangement of its wooden houses, to be called a town. In truth, the unoccupied spaces within its precincts exceed those which are built on; yet the regularity of its market-place is agreeable to eyes long used only to labyrinths of Tatar cabins. The officers charged with the administration of the surrounding country reside here, together with some Russian farmers, artisans, and carriers. A coffee-house and billiard-room, kept by one of the bearded settlers, recalled to our minds the enjoyments of Western Europe.

The postmaster of this place proved to us an extremely interesting acquaintance. His travels through the mining districts of the Uralian mountains had suggested to him the important thought of seeking for gold in the alluvial soil round Malmuish. In fact, I saw here, as the result of some experiments made on a very small scale, a residuum of magnetic sand, exactly like the metallic residuum which we subsequently saw at the gold-washings in the Ural, and unquestionably containing gold, though in a less degree. This was proved at the works for separating the gold, to which the discoverer had sent specimens of his washed sand. It is owing, no doubt, to the existence of richer deposits in the immediate vicinity of the Ural, that the mining authorities have hitherto neglected the alluvium of Malmuish. But for the geological theory of the production of gold in the Ural, an acquaintance with that alluvium is of no slight importance. The inquisitive and vigilant ob-

server of the geology of this place showed us also trunks of trees converted into hornstone, which he had found in the course of his experimental digging near the town; together with many well-preserved remains of mammoths' skulls, which had been dug up from the alluvial sand and mud of the low valley of the Vyatka. The fragments of rocks of various kinds here swept together, and along with them contemporaneous remains of an extinct vegetation, are proofs of a very ancient flood, which spread uniformly over the land; while soft alluvium, enclosing the elephants' bones, occur only in the valleys and other hollows of the stony soil, as if deposited by later inundations.

In the government of Vyatka, there are already numerous large establishments for the preparation of the Uralian metals; and in order to secure their future prosperity, there has been introduced an economy in the management of the woods—a strict forest administration—which is hardly known in other parts of the Russian empire. From the forest officers residing in Malmuish we learned that bears are still numerous in the woods at this place, and that the killing of them is a profitable business for the inhabitants. The people join in large companies for their hunting excursions, and kill the bears with lances. Malmuish lies, if one may judge from the fall of the rivers, not more than twenty feet higher than Kasan; that is to say, from 100 to 120 feet above the level of the sea.

After sunset we left the town, and in about an hour, with bright moonlight, reached the river Vyatka, here about 600 paces broad, the right bank, to which we had arrived, being from 80 to 100 feet high. Watch-fires were burning on the banks at both the landing-places of the ferry-boat. The steep hill of the right bank, which I climbed while the people were busy in embarking our carriage, consists entirely of soft alluvial soil; and no one would here suspect the ex-

istence of the rock which prevails all around. Similar phenomena of recent alluvium, which, particularly towards the upper edge of the rivers' beds, has covered over the older formations, have been already observed at more western points of the plains of Northern Russia. We arrived soon after at Melet, ninety-two versts from Metyeshka, where our day's journey ended.

August 22. — We travelled through a country thickly wooded, 110 versts north-eastward, to Kójil. With a clouded sky, and southern wind, the temperature of the air rose in the course of the day as high as 18° R. Partial showers of rain then fell; some on the line of our route, some towards the side, and was then only recognisable by the clouds. The ground grew so warm that the vapours rising on the borders of the wood after every shower, and projected on the horizon, looked like dark clouds. In the hamlet of Kilme, forty-four versts from Melet, and those of Mukikaksi and Siumsimojgi which succeeded, we saw for the first time Votyaks, the aboriginal inhabitants of this country.

The names of the villages here already remind one of the Finnish language, and still more the sound of the Votyak speech. Yet the men of this tribe differ very decidedly from the Chudian tribes of the Cheremisses and Chuvashes. There is no sign among them of that timid demeanour, and that feeble frame of body, which were so obvious in the latter people. The Votyak men have compact and stout figures, with broad shoulders, like the Russian peasants. They let their hair, which is almost always red, grow wild on their heads, but cut their beards except on the upper lip. Their clothes are made of dark grey unbleached cloth; and in the girdle over the hip they always carry a broad knife, which proves a very effective weapon on their hunting excursions.

In this place we saw the water for the most part collected into wells only twenty or thirty feet deep. Within that short distance of the surface, therefore, there is here a stratum impervious to water, whereas at the other side of the Volga such a stratum is not found till we arrive at a depth of 80 or 100 feet. This phenomenon also conduces to show that upheavings have here taken place parallel to the chain of the Uralian mountains. Ordinarily, as we ascend the slopes of hills, the nucleus of which is formed of the older stratified formations, we find the crust or covering grow thinner, and this is exactly what takes place here. On the summit of the ridge, the later and softer strata totally disappear, and the more solid rock which rises to view forms water partitions, as we have had frequent opportunities of observing in the course of our journey, as, for example, in the vicinity of Kójil.

From a comparison of the barometrical observations made at Kójil with those previously made at Malmuish, and subsequently at Perm, it appears that the first-named place has an elevation of 830 feet above the sea; the ground rising gradually from Melet, which has an absolute elevation of only 150 feet. It was quite obvious that on the gently sloping ridges which we saw to-day the fall towards the west was much more considerable than that to the east.

August 23.—We went from Kójil to Surí, 116 versts. On this tract Russians and Votyaks live together in the villages. The woods are completely cleared away, particularly in the first half of the distance, and open arable country predominates. The effect of this denudation of the earth's surface on the character of the summer, was displayed to-day in a very striking manner; for while in the thickly-wooded country which we passed through on the preceding days, frequent showers from heavy clouds, rolled along

by the south wind, poured down without the least appearance of a storm, the reverse took place this morning. In the open plain, near the village of Kilmes-sotti, twenty-four versts from Kójil, we had a violent storm of thunder and lightning, from clouds by no means heavy, and there was no rain at all. If it be assumed that cooler and moister air enveloped the woods, it is easy to understand that as the rain there fell to the ground, the electricity accumulated in the clouds was conducted by it, and was thus dissipated without a storm. But, on the other hand, the clouds from the south to-day were separated from the earth by a dry stratum of air. The drops which fell were probably dispersed by evaporation before they reached the earth, and the clouds being thus isolated, the electrical equilibrium could be restored only by lightning penetrating the interposed stratum of dry air. One might have expected a hail storm under these circumstances, if it were not that the showers of rain which we had previously witnessed proved how little it is, after all, that falls here. The elevation attained at Kójil continued unchanged through the tract passed over to-day.

August 24. — From Suri to Dubrova ninety-four versts, the road passes again over a broad ridge of hills between Suri and the next station, Débyósui, twenty-three versts from the preceding. The highest point of it, as determined by the process already indicated, lies about 160 feet above Suri, and 1020 above the sea. Suri and Débyósui are at one and the same elevation; as also the little river Chépza, which, rising to the north-east of Débyósui, runs from this place north-westwards along the foot of the ridge. As far as the next station, Chépza, forty-one versts from Suri, the road goes always close to the river of the same name, approaching its sources. From this place there branches off to the right a road of ninety-three

versts, to the celebrated smelting-houses of Votka, situate S.S.W. of Chépza, and thence again forty versts to the S.W., to the still more important iron works of Ije.

The following particulars respecting the chief points situate on the side of our road, at some distance from it, I owe to M. Eversmann, who visited them in 1812. The description of these thriving establishments contrasts in a surprising manner with the character of the adjoining country, such as it has appeared hitherto along the great road to Perm.

On approaching Votka through the villages of Rossválui, Polósova, and Kilchi, all inhabited by Russians, the ground sinks rapidly near that place, and the traveller becomes aware of the elevation of the country which he has left. The iron works of Votka, belonging to the crown, are situate at the junction of two small streams, which, uniting with the Siva, run into the Kama, about twenty versts lower down.

The raw iron, procured at Kushva, on the eastern slope of the Ural (in lat. 58° 16′ 32″ N.), may be carried down by an uninterrupted water communication to Votka, a distance in a straight line of 224 geographical miles; first it goes westward down the Chúsovaya; then south-west down the Kama; then about seventy miles, or five times the direct distance, against the streams of the Siva and Votka, into the pond at the factory, which is made by damming up the two rivulets, and the water of which serves to drive some over-shot wheels.

At the smelting houses of Votka there were living in 1812 a population of 6000 souls, which would be increased, however, to double that number if we were to add the inhabitants of the villages belonging to the district. Fourteen smelting furnaces, with a corresponding number of hammers, and various other machinery, serve to prepare the iron used for the

artillery. But besides this, ships' anchors, and iron pots or crucibles for melting the silver in the mint at St. Petersburg, are wrought in Votka in the most perfect manner.

Anchors, weighing from one to five tons, are made of bars grouped together, and experience has conducted to a result, which is theoretically very interesting, that in order to give the shaft and arms of the anchor the greatest possible tenacity, the outer bars alone must be welded together in perfect continuity, the inner ones being left more loosely combined. The lighter anchors are delivered at St. Petersburg, at the price of about nine roobles the hundred weight, including the cost of carriage. Those of great weight are relatively cheaper.

The forging of the iron crucibles in Votka was a remarkable operation. The largest of them, weighing 23 cwt., were capable of melting at once 100 poods (4000 lbs.) of silver.

Several instances have occurred here of self-taught men of genius rising from the subordinate drudgery of the forge, till they became the reformers and improvers of the works, in the chemical as well as mechanical departments. One of them, Lev Sobakin, of whose inventions Ije was the principal scene, erected in Votka also an ingenious piece of mechanism for cutting the circular wadding used in charging cannon to separate the powder from the ball.

Semön Bodáyev also, a workman at Votka, discovered so effectual a method of making cast-steel, that the cutlers of St. Petersburg deemed this home produce fully equal to the cast steel which they had previously obtained only from England. This fact having caught the attention of the government, Bodáyev received not only sundry external decorations, but substantial and liberal assistance also, which enabled him to erect large works at Votka, in order that

he might perfect and profit by his discovery. What makes his process more remarkable is, that it deviates widely from that adopted in England, while it arrives at the same result.

In the preparation of raw steel also, there is a peculiar, though not a completely successful, mode of proceeding followed in Votka, and most of the Uralian smelting houses. A strolling Russian smith is said to have been the inventor of this practice, and to have brought it into vogue about the beginning of the present century.

The road from Votka to Ije, twenty-six miles S.W., leads over a gently undulating country of recent formation. Ije stands exactly on the line of separation between this calcareous rock and the clay slate which lies upon it. So that here, at the lower part of the government of Vyatka, are found formations intermediate between those which, further north along the great Perm road, appear to follow in immediate succession.

The manufactories established at Ije are chiefly employed in making muskets for the army. The settlement, which might be justly styled a town, contains 18,000 souls, and its appearance corresponds with its prosperous condition. The plan of the establishment was drawn up at the beginning of the century, and the expenses of executing it were liberally defrayed from the private funds of the Emperor.

The dwellings of the officers employed in the works were erected in a grand style on the hill overlooking the great pond, which is formed here also by a dam across the river. The workhouses, which are equally well finished, and of colossal magnitude, stand at the foot of the dam. M. von Eversmann remarks that a different arrangement would have been more judicious; since the humidity of the air in the low buildings proves an obstruction in many kinds of work;

and besides, the bursting of the dam — an accident quite within the limits of possibility — would, under actual circumstances, destroy the whole establishment.

Inseparable from the history of this flourishing colony is that of the Russian mechanician already mentioned, who assisted in training the rising industry of Ije. Lev Sobakin was born in 1742, a serf in a village belonging to the convent of Staritsa, in the government of Tver. The monks had taught him to read the Psalms in the old Sclavonian writing, and intended to employ him in painting holy images; but a clock which the youth saw accidentally in the chamber of the Archimandrite, awakened in him an inclination for mechanical contrivance, which soon grew irresistible. The convent however was suppressed, and Sobakin was obliged to labour in the fields; nevertheless he found leisure to make a wooden clock, which he afterwards disposed of for a broken watch and fifteen roobles.

He thus had an opportunity of making himself intimately acquainted with a second piece of mechanism, and having repaired the broken chain of the watch, he sold it again, and procured fresh means to renew his labours. He contrived at last to represent on his clocks the chief celestial movements, such as are known in the convents, and applied in the preparation of the church calendar. A piece of work of this sort was shown to the Empress; and the inventor being interrogated respecting the principles on which it was constructed, replied with such surprising clearness, that it was resolved at once to lend him support, and enable him to cultivate his talents. Sobakin was accordingly sent to England, that he might have the fullest opportunity of pursuing his mechanical studies; and on his return to Russia he was appointed superintendent of the machinery at Ije, and stepped at

once from the humble position of a serf, into the independence of a superior officer.

Of the apparatus erected or brought into use under his direction, much was undoubtedly invented by himself, and quite original; a merit which was the more cheerfully acknowledged by the other Russian officers, because their national feeling revolted against the great superiority hitherto claimed by, and conceded to, foreigners in this department. It conduced much, for example, to the perfection of the fire arms made at Ije, that every piece was made there according to a model, and if it did not exactly fit or correspond with that model, was rejected by the overseer. The system of shaping the several parts by simple pressure was also carried to a great extent. All the pieces of the same denomination in Russian arms are consequently so perfectly equal and alike, that the experiment has often been successfully made of taking to pieces a large number of muskets, and then, from the promiscuous heaps of similar parts, to put them all together again.

The stamping machine, which, with three quick strokes, formed the lock-plate in a cast-iron mould, was so arranged by Sobakin that the weight of the lever and its counterpoise of a hundredweight was withdrawn from the worm of the press screw at the moment of the stroke; so that the most important part of the apparatus was thus saved from rapid wear. It took just three minutes to give a lock-plate, which was three times heated and as often impressed, not only its shape but also the requisite polish.

The barrels of the guns are made by hand, and thus an especial responsibility is thrown on the workman. If a gun bursts in the proof, the place and character of the fracture indicate with certainty where the process failed, and the smith thus convicted of negligence pays for the loss. The barrels are

twice proved; first, in the rough state, and afterwards, with a somewhat smaller charge, when finished. Only four per cent. of the fire-arms made at Ije burst in proving. Vices, files, and other tools required in the manufacture of guns, are all made in the place.

The direct road from Ije to Malmuish, a distance of 285 versts, is occupied by Tatars for about 58 versts, as far as the village of Píchtova, so named from the Píchta, a kind of pine which there forms considerable woods. There it is joined by the road from Sarápul to Kasan, along which, the Votyak population preponderates for 91 versts, as far as Yelabúga, some Mordvi, however, still maintaining their ground among them. From the last-named place to Malmuish, Russians and Tatars are intermixed along the road. At the place where the Vyatka is crossed, the Russians have established themselves in the little village of Lyubyána.

The only hilly tract is between Píchtova and Yelabúga; the rest of the road is quite level. The ground rises little above the level of the middle course of the Vyatka, and certainly there is not, in that quarter, any point so elevated as those which we met with further north on the great road to Perm.

In the course of this day's journey, we crossed (40 versts from Suri) the boundary line of the government of Perm, the last line of the kind that is passed before arriving at that which divides the two continents; for the eastern half of this province is assigned, by geographers, to Asia.

Throughout this hilly country, Russian villages are numerous, and tillage succeeds completely. The village of Sosnovka, so named from Sósna, a fir tree, is remarkable for the prettiness of its site. In the close dell of a rivulet running southwards, lie the houses of the inhabitants, who are in good circumstances, and who unite habits of cheerful industry to the religious

manners of the sect of the Old Faith. Flax is cultivated in the fields with advantage.

In the evening, a little before we arrived at Dubrova, we saw, on the open plain at the side of the road, a caravan of many hundred people, men, women, and children, who had there unyoked their kibitkas and tilegues, which were laden with all their worldly goods, had lighted fires, and were preparing to make themselves comfortable for the night. We were told that they were "*Bárskie Lyúdi*," that is to say, "lords' people, or serfs, who had been hitherto living in the neighbourhood of Great Novgorod, but were now removing to new and better abodes in Asia." They seemed themselves to be pleased with the journey. I subsequently saw these emigrants settled down on the eastern side of the Ural, in the iron-works of Tagilsk, which belong to the Dimidof family; but I felt loath to ask them, whether the owner of their new abodes had purchased them of another proprietor, or whether, as is more likely, after their journey of 1200 miles, they still remained in the hands of the same territorial lord. In truth, great migrations such as this, are much more remarkable now-a-days than they were at the time when the chief, in the nomadic fashion, used to put himself at the head of his people, and lead them in their wanderings, but the liking of the people for a strolling life remains unchanged. At the same time, they conceive themselves to be in their own country, so long as they hear the Russian language spoken, and hence it is, that they never look upon exile to Siberia as a severe punishment.

During the 80 versts from Débyósui to Dubrova, the constant descent of the road is observable, and the barometer shows that the last-named place is but 456 feet above the sea, and consequently 404 feet lower than Suri and Débyósui, and 563 feet under the ridge between those places. This rapid sinking of the

country, from west to east, can alone explain the remarkably tortuous course of the Kama; for this river rises at a point distant only 50 versts, at the utmost, from the elevated ridge pointed out above, in about lat. 58° 1′ N., and after flowing N.N.E. from its source, till it reaches lat. 64° 4′, it turns due south for a long way, and then again towards the south-west, so that a little north of Okhansk, after a course of more than 800 versts, it is still not above 70 versts distant, in a straight line, E.S.E., from its source. In that distance of 70 versts, in the direction of E.S.E. there is, therefore, as much fall as along the 800 versts of the river's course. It is not likely that the sources of the Kama are higher than the ridge of hills between Suri and Débyósui, and the incline, therefore, from those sources to Okhansk, will be 670 feet, or, on an average, 0·234 in 1000 along the bed of the river, but 2·758 in 1000 in the direction of E.S.E.

August 25.—From Dubrova to Perm. Dubrova is a thriving Russian village, the well-conditioned fields of which are environed by thick woods. Some isolated oaks still stand on the hilly banks of the Kama, in the neighbourhood of Okhansk, 26 versts from Dubrova. Some windmills on the more elevated parts of the river's bank seem to constitute the most important possessions of the inhabitants of this wretched little wooden town; for the Votyaks living in the neighbourhood sell for a trifle the wheat and other bread-corn, which they often keep heaped up before their doors, with the straw, for years together. These people prepare the flour for their own use after the ancient and rude fashion: they lead the water of a rivulet so as to fall on boards fixed in a nearly horizontal plane to the vertical axis which bears the millstone.

The rapidly-flowing Kama was even now, near Okhansk, about half a mile wide; but in spring, when

the water is high, it overflows to a much greater distance the low tracts opposite the town. From this place we went about 60 versts over steep hills, the dark woods on which were formed exclusively of firs. The road goes from Okhansk, north-eastwards, direct to Perm, while the river deviating from the straight line, between the two places, winds to the north-west.

CHAP. VIII.

PERM, ITS SIMPLE STYLE.—RAPIDITY OF THE KAMA.—VIEW ACROSS THE RIVER.—MINES OF ACHINSK.—MODE OF WORKING.—PRECAUTIONS AGAINST FIRE.—GREAT EXTENT OF THE COPPER ORE.—ELEVATION OF PERM.—KRUILASOVO.—GYPSEOUS ROCK.—KUNGUR.—SPRINGS OF SLATOÚSTOFSK.—THEIR TEMPERATURE.—SMELTING HOUSES OF IRGINSK.—BISERSK.—GREAT ELEVATION.—KIRGISHANSK.—CARAVAN OF PRECIOUS METALS.—BOUNDARY OF ASIA.—FURNACES OF BÍLIMBAYEFSK.—HIGHEST PART OF THE ROAD.—THE DESCENT.—THE RIDGE OF THE URAL.—YEKATERINBURG.

About seven o'clock in the evening, we reached at length a widely-cleared and well-cultivated plain. The fields of wheat were still green, but promised an abundant harvest. We then passed through the populous village of Danilikha, which is separated from the broad streets of the government town only by a handsomely built barrier and the alleys of birch trees that adjoin it. As the name of Perm is usually associated with the idea of the wealth derived from the Uralian mines, one is surprised at the simple, unpretending style of the place, for good stone buildings are seen only here and there; but the houses in general consist of several wooden structures of a single story, ranged round a quadrangular court, which is divided from the street by a boarded fence. Single portions of these congregated dwellings exhibit occasionally a more light and elegant style, and are coloured outside. These contain the summer apartments, while the double screens, formed of black timbers joined together, are the rampart-like walls of the winter apartments and offices. The streets are kept very clean, and have at the sides the mostovie, or raised wooden footways.

Here, too, our drivers conducted us, without asking a question, to the house of one of the wealthier inhabitants, in which all strangers are received with hospitality, but private individuals, in this case, make some payment, at their discretion, while officers travelling in the service of the state conceive themselves entitled to gratuitous entertainment.

August 26—28. — One of the main streets of Perm leads down with a gradual descent to the brink of the fast-flowing Kama. Even now several flat-bottomed boats are lying here at anchor; but the commerce in which they are engaged is only that with the towns along the river in the vicinity, the wants of which they supply, for the carriage of the productions of the Ural takes place always in the early part of the year; and indeed it begins even before the end of April, as will be stated lower down from authentic sources of information, because the rivers are then more full of water, and the frequent shallows in them are less dangerous for heavily-laden vessels. The water is here at the lowest usually towards the end of August, when the depth of the Kama is about 10 arjines, or 23 feet 4 inches less than in the spring. The bed of the Kama in this place sinks down rapidly, and I found the water a fathom deep a few steps from the bank. The seemingly great velocity of the stream can in reality hardly amount to two feet in the second near the bank, for a swimmer can easily overcome it, and ascend the river against the current. At various other points of the town the perpendicular face of the river's bank exposes to view horizontal strata of sandstone.

Pains have been taken, and most judiciously, to bring together the handsome stone buildings round an open area near this declivity; and in the middle are some seats roofed over. The view from this spot is singularly well calculated to rivet attention. On

the opposite side of the river is seen an extensive plain, rising with a very gentle ascent from the water's edge, and varied only by the straightlined, stiff forms of dark fir trees, which seem incapable of being shaken even by the wind. The trees are low, and, near the river, are scattered uniformly, at wide intervals. Heaps of felled timber lie among them without interrupting in the least the view of the still more distant trees, the only thing to be seen, so that the great extent of the monotonous waste is a clearly-marked feature of the landscape. Death-like silence and absence of all movement maintain their solemn reign throughout the forest, and so seldom are they interrupted, even in the foreground, by people passing by, that one cannot help thinking of the romantic tales of petrified or enchanted woods in which stand lone castles, the inhabitants of which are extinct. This portion of the neighbourhood of Perm has a striking resemblance to the more elevated plains of the Upper Hartz. Down from the river towards the east, pretty alleys of birch have been planted on the smooth surface of the mounds surrounding the town, and from them one looks down on the green cultivated fields and the populous village, which adjoins Perm as a suburb. Thus the influence of human art and industry in the landscape may be easily recognised here by the comparison of points not far asunder.

The growth of various establishments in Perm would never allow one to suppose that the settlement had existed scarcely fifty years. Carriages for hire are ranged and engaged at the gates of Perm just as in St. Petersburg. It is only the general and supreme control of the affairs of the Uralian mines which is given over to the Board of Mines settled here; but the administration in particulars is left to the officers who have an immediate and practical

knowledge of local circumstances. In like manner, the supreme courts of the municipal, the fiscal, and the criminal jurisdictions, are all established in the government town. But during our residence in Perm our time was so much occupied in pursuits connected with the main objects of our journey, that with regard to these institutions we learned only to know the exterior of the edifices devoted to them.

The mining which is carried on at Achinsk, near the town, in a tract of country hardly varied by a hill, had more attraction for us. We went nearly three miles up the Kasan road; first, through the suburb of Danilikha already mentioned, in which the majority of the tenements belong to what are called *Odnodvórtsi*, that is to say, free owners of small plots of ground; we then went an equal distance from the great road down to the south-east, till at length the high chimneys in the open plain announced the mines. The same sandstone strata which lie exposed in the banks of the Kama, in the town, are here covered by a thin bed of loose pebbles and alluvial deposit. The miners have penetrated about 98 feet deep into this rock, and have there found a stratum of very argillaceous sandstone, much traversed with oxydised copper ores.

There were two shafts in use, one of which served as an entrance for the workmen, while through the other were sent up the ores by means of baskets and ropes, all made of bast; the water which collected below was pumped off also through the same shaft. Galleries and cross galleries, six fathoms asunder, were driven from both shafts as far as the metalliferous deposit was found to extend. The galleries were kept open by shoring with timber. When the workman finds that he has reached the termination of the copper ores, he then cuts down, as he retreats, the pillars that were allowed to remain for the sup-

port of the gallery, erecting others in their place, of the common non-metalliferous stone. There are numerous traces on the plain of ancient shafts leading to places long since exhausted. The pumps of the shafts now in use are worked by horses; the baskets laden with ores are hoisted by men with windlasses. The bast ropes require to be renewed every three or four weeks; but they cost only one rooble for 100 sajenes (700 feet), or about seven times the depth of the pits. The water flowing copiously from the pumps had a temperature of only 2° R., and thus indicated a less degree of ground-heat than we had found at any point of our previous route. The workmen all agreed in assuring us that the water flowed into the pit with equal force the whole year round; thus it appears here also, that the freezing of the upper strata, of variable temperature, does not affect nor check in the least the influx of water in the warmer strata underneath.

In the miners here one observes no trace of those attractive peculiarities which distinguish people of the same avocation in Germany. Their dress does not differ in any respect from that of the Russian peasant, and they have no characteristic usage, such as the German miner's salutation. An experienced workman leads the others in their operations, and is entitled mástuir (master); but without any guidance, the work is so simple as to be easy to any one. The ore bears the general name of *rudà*, derived from *ruity*, to dig. The miners of Achinsk live together in a little village, which is situate in a fertile dell close to the pits.

Even here is observable a precautionary arrangement in case of fire, usual in all Russian mines and smelting works, inasmuch as a special office is previously assigned to every one of the inhabitants, should such an accident happen. On a sign over

each door, are painted the tools or utensils which the inhabitants are to lay hold on the moment the fire bell rings. A bucket to carry water is on every sign, since this indicates the universal employment of the women; along with this may be seen a hatchet, a spade, a fire engine, or the like. The management of the fire engine is always left to those of the inhabitants, the material of whose trade is leather, as they are supposed to be better able to keep the hose in good order.

It was probably the insight afforded into the lower strata by the dell at the village which gave occasion at first to the finding here of the ore coloured with copper, and subsequently to the foundation of Perm; for a smelting house for copper was the first building which was erected in 1780 on the Kama where the town now stands. At present, these works have been allowed to sink into inaction, and the produce of the pits of Achinsk is smelted at the works of Yugovskoi, thirty-two versts S. S. W. from Perm.

The deposit of coppersand ore, with which we here became acquainted at one point, has a great extension; for it has been fully recognised as to identity, and brought to light by the miner, from the place where the river Kosva enters the Kama, in lat 58° 48′ N., to Orenburg, in lat. 51° 45′ N., a distance in the direction of the meridian of 480 miles; and from W. to E., between the river Suilva at Kungur, 56° 23′ E. as far as Mioshinsk on the river Miosha, which falls into the Kama just below Laishef, 49° 26′ E., or about 280 miles. Consequently this mineral has been found, of perfectly uniform quality, throughout an area of 100,000 square miles.

It is very possible that, beyond the eastern and western limits here assigned, the cupriferous stratum cannot be reached by the miner; but that, northward from the Kosva, it is to be found, not far below the

surface, is extremely probable, the regular and scarcely perceptible dip of the strata towards the west, which is observable there, being taken into consideration. Thus it appears, that in the northern regions of the earth belonging to Russia, there reigns among the lifeless rocks the same wide diffusion of similar phenomena, which is characteristic of the vegetation, and even of the manners of the people.

We found the barometer in Perm to stand at 335‴·49 (29, 76 inches), taking the mean of several observations made during our residence there, the weather being fair and calm, and the temperature of the air 14°·5 R. In determining the elevation above the sea of the various points in the immediately succeeding portion of our journey, we have combined the observations made at each place with those just mentioned, as well as with the observations subsequently made at Yekaterinburg; and have thus been led to assume the elevation of Perm to be 370 feet, and that of Yekaterinburg 850 feet. Both these assumptions are founded on long-continued series of observations, the result of which was communicated to us by M. Pansner in St. Petersburg. As to the correctness of the barometer by Heber, which was used for these last-mentioned determinations, we fully satisfied ourselves by comparing it with our own.

We left Perm in the afternoon of the 28th of August, in order to reach Yekaterinburg without further delay. We went sixty-six versts towards the S.S.W., on the road to Kungur, and spent the night in the imperial posthouse near the village of Kruilasóvo. Open arable country here predominated, and the form of the ground, as far as one could perceive in the dusk of the evening, continued exactly like what we had observed before reaching Perm. At the station of Yanuichi, forty-two versts from Perm, we

found ourselves, according to the testimony of the barometer, 550 feet above the level of the sea; but at Kruilasóvo about 425 feet. The little river Babka, which touches on both places, appears accordingly to have a fall of 124 feet in a course of sixteen miles; that is to say, of 1·48 in 1000, or more than six times the fall of the singularly circuitous river Kama.

August 29. — From Kruilasóvo to Buikóva, ninety-six versts. Near the former of these places the character of the landscape underwent a sudden and remarkable change. On the further or left bank of the Babka, a steep acclivity rose at once from the water. In the openings of the dark wood of firs which clothed it could be discerned the naked rock which formed the mountain — a brilliant white gypsum, split into roundish blocks — projecting here and there.

We crossed the river, and, as we wheeled round to the south, great masses of the same rock, split asunder but not stratified, continued along the left of the road, like an immense wall. On approaching Kungur, the road ascends to the western slope of the hill which here strikes towards the north. On the top of the ridge, the dazzling white gypsum projects only here and there, above the brightened clay which covers the surface. If the view of the far-stretched wall of gypsum had already reminded me, in a lively manner, of the similar one which in Germany extends along the southern edge of the Hartz, the resemblance became here still more strongly marked, so that the geologist might imagine himself to be looking at the country round Ihlefeld.

The buildings of Kungur lie scattered, partly on the summit of these hills, partly on their eastern slope. Several well-built stone houses, belonging to

the officers of the Permian mining department who are settled here, contribute to adorn the landscape. Near the town, on the north-east, flows the Suilva, between steep cliffs. We found the elevation of the town above the sea to be 500 feet.

We turned now to the south-east, and left the valley. Here the masses of rock, projecting from the level surface round about, were a yellowish, irregularly perforated, and, as it were, corroded limestone, closely resembling, in outward form, the rocks of gypsum which we had just seen. Now there can be no doubt that the same causes which converted the external margin of the calcareous deposit into gypsum, operated also, though probably in a lower degree, in giving the rocks seen here their blistered and corroded appearance, and occasioned the cleaving into amorphous blocks instead of regular stratification. The fluoride of calcium, also, which is used in large quantities at Yugofskoi, twenty-two miles S.S.W. from Perm, in smelting the copper ores, is found at the western margin of the limestone mountain, and marks, in a still more determinate manner, the place where the strong acids, ejected, through cracks probably, from the interior of the earth, gave the limestone its ruined appearance. We remarked that where this rock came to the surface and was quite exposed, there was a rapid ascent of the ground to the next station, Morgúnova, twenty-seven versts from Kungur, where we found ourselves 520 feet above the level of the Suilva at the last-named place, or at an absolute elevation of 945 feet. The road then descends again perceptibly, and a loose mould conceals the rock, assuredly at no great depth, while it favours agriculture, which is in this place carried on by a population exclusively Russian. At length the traveller reaches the remarkable district in which stands the village of Slatoústofsk, or Kliuchi, that is

to say, of "the Golden Mouth," or of "the Springs," fifty-five versts from Kungur, and seventy-six from Kruilasóvo.*

The wooden houses of the village lie to the right of the road; but to the left one sees with astonishment a perpendicular cliff, about fifty feet high, beneath which, and just below the houses, gush forth the springs to which the place owes its name. Copious rills burst out from several openings in the loose earth at the foot of the cliff, and, soon uniting, they form at once a considerable brook, and flowing into the Irgina towards the south east, hasten with it to join the Suilva.

Nothing, in truth, but a very peculiar structure of the rock beneath the surface can explain so abundant a discharge of water, in a place, too, where but little falls from the atmosphere; and the justness of this remark is confirmed by a variety of local circumstances. The inhabitants say, that the ground on which they have ventured to set their habitations is undermined with caverns. Slips and sinking of the earth are here usual occurrences; and, in such cases, the old rivulets disappear, and new ones spring forth in their stead. Indeed the ground is here so uncertain a possession, owing to its subterranean constitution, that the peasants no longer take the trouble of cultivating the treacherous fields around them, but ply their agricultural labours at a distance from the village, where the soil is less fruitful, but possesses more stability.

The water of the springs at Slatoúst had a tem-

* Slatoúst, or gold-mouth, is a local name of frequent occurrence in Russia. It is formed in honour of the saint and local patron Johannes Chrysostomos, in Russian, Joan Slatoúst. Most of the other frequent names of places refer likewise to the saints to whom the churches in the respective localities are dedicated. Thus, Bogoròdsk is the adjective from Bogoróditza, the god-bearing: Pokrofsk from Pokrof, which means the veil of Mary in the legend; Krestofsk from Krest, the cross.

perature of 4°·5 R., or nearly the same which we had found in a number of springs on the way from Kasan to Perm, but about 2°·5 R. warmer than those in the pits at Achinsk. It would certainly be too hasty, to raise objections on account of this apparent disagreement of results, against the acute remark of Röbuck, that the constant heat of the deeper strata of the earth, and the local power of vegetation corresponding to it, may be ascertained by observing the temperature of the springs. We are now enabled to view this important doctrine of climatology from an entirely novel point of view, since the existence of a source of heat in the interior of the earth has been established beyond dispute. We now know that the outer crust of the earth is subject to change of temperature with the seasons, while beneath there is a stratum having the mean temperature of the air; and below that, the further we proceed, the higher we find the temperature. Springs, which issue from that moderate depth at which the earth has constantly the mean temperature of the air, can have, in high latitudes, but a scanty supply of water during the winter, for the heat of that stratum can hardly suffice to thaw the superincumbent ice; but when, on the other hand, as is often the case in mines, the rock, permeable to water, reaches to the depth where higher temperature prevails, then conduction of heat, melting of ice, and permeation of water go on with more activity; nay, through summer and winter, as we found to be case at Achinsk, the water produced from ice and that from warm rain trickle down to those depths in equal abundance, and one can easily understand the explanation of the apparent paradox, that colder springs are to be found in the deeper, and therefore warmer strata, than exist, under similar local conditions, near the surface of the earth; for the cold waters of winter reach the depths in the one

case, whereas, when the water is retained by superficial strata, the flow in winter is sure to be very limited, and the total product of the annual infiltration must, of course, be above the mean temperature of the air. Supposing, then, the solid stratum, which has constantly the mean temperature of the air, to lie every where at the same depth, water, having the same property, must be sought at a greater depth, the longer the ground remains frozen at the place of observation.

Slatoústofsk stands at an elevation of 640 feet, in a broad hollow, the lowest line of which is marked by the course of the river Irgina. During our journey of twenty versts to-day to Buikóva, where we spent the night, we again rose to the elevation of 850 feet.

Down from this place, towards the west, and about ten miles distant, lie on the Irgina the important smelting-houses of Irginsk. The scoriæ, used to mend the road, were the only indication we had of the proximity of these works. The same observation applies to several other works in the neighbourhood, which belong to private people, and are worked on their account by serfs. Removed from neighbours and external assistance, the population of these settlements must exert all their energies, in order to provide for their own wants, as well as for the multifarious demands of a complicated business, and consequently care is taken never to place their smelting-houses near the great roads, because the inhabitants would be there bound to provide horses, and perform other duties connected with the post.

August 30. — We have already remarked, that Buikóva has an elevation of about 850 feet, and is, therefore, at nearly the same height as the points passed over yesterday, half way between Kungur and Slatoústofsk. Thus the conviction grows stronger, that the country about Slatoústofsk has suffered a

depression of about 214 feet only in the line from north to south ; but that from that place there is a quick ascent both to the east and west. It is a justifiable supposition, that this depression, though on a great scale, is attributable to the cavernous constitution of the ground, which is the cause of so much local sinking. Between Morgúnova and Yekaterinburg there is not a single point, excepting the broad hollow of Slatoústofsk, which has a less elevation than 850 feet above the sea.

One grows here continually more convinced of the justness of the speculative opinion already intimated, that the elevating forces, which formed the Urálian mountains, exercised a very perceptible influence on the form of the ground, to the distance of 300 miles from the main ridge, and produced the same phenomena in several different places. In the interval between Kójil and Debyósui, already referred to, we found extensive tracts, having an absolute elevation of from 850 to 1060 feet, and then suddenly sunk to the plain of the Kama, only 370 feet high. Then, again, between Morgúnova and Buikóva, we found the prevailing height of the surface not to exceed that already observed between Kójil and Debyósui. But at Slatoústofsk again comes a depression, in this case, however, not more than from 250 to 300 feet below the prevailing limits of elevation; whereas the broad plain of the Kama, further west, was at least 600 feet below the highest point attained on the previous part of the journey.

We made to-day a journey of ninety-seven versts, from Buikóva to Kirgishansk. The level and fertile character of the country round Buikóva continues unchanged for six or seven miles. The rich corn-fields seen here are said to belong to the inhabitants of the large Russian village of Kréstovosdvíjenskoe, or the Elevation of the Cross, which is situate from three to

four miles east of the smelting works of Irginsk. Then a stony tract follows as far as Achitsk, and beyond that again, to Bisersk, which places are respectively twenty and forty-one versts from Buikóva. The marly stratified limestone which here comes frequently into view has no longer the corroded aspect and the porous texture which were so striking on the west of the Irgina. Nor does one see any longer the wall-like ledges of rock so remarkable in that region; but an even surface extends, with a gradual ascent, to Bisersk, where we found ourselves 885 feet above the level of the sea. Near this village the river Biser is crossed by a wooden bridge.

The tract which follows, twenty-five versts from Bisersk to Klenofsk, is extremely hilly, and rises continually for the first ten miles, until it attains the absolute height of 1550, the greatest elevation hitherto met with. Then, for about six miles to Klenofsk, the road has so many steep descents, that we saw the intrepid Russian drivers reduced, for the first time, to the necessity of putting the drag on the wheels. The descent to Klenofsk amounts to 575 feet; consequently at this place we found ourselves at the height of 980 feet. In the vicinity of the village, which is a large one, the wood is completely cleared away, and corn-fields in good condition extend along the banks of the little river Biser, which flows from the north. The stones which lay strewed on the surface were all of the same compact limestone, which was here, however, of a darker blue.

The appearance of the country remained unchanged to the next station, Kirgishansk, thirty-one versts from Klenofsk. The summits of hills of more considerable height, but in every instance covered with wood, were visible on the sides of the way; and the road itself ascended several long steeps, till at length it reached Kirgishansk, 1315 feet above the sea. Just

before we arrived in this place, where we spent the night, we saw that a change of geognostical relations was indicated by quartzose rubble and the gravel of siliceous slate, of various, but chiefly greenish, colours. These lie in an argillaceous cement containing quartz sand, and which is much weather-worn at the surface.

We met, at Kirgishansk, with several waggons, which, attended by an officer of the mines, were conveying to St. Petersburg a quantity of the noble metals (gold and platinum) obtained in the district of Yekaterinburg. These valuable productions of the Uralian mines are always conveyed by the road, the river navigation not being free from danger for such freight. They are only extraordinary remittances which are despatched at this season; for what are properly called the Uralian gold-caravans, which are joined at Yekaterinburg by similar caravans from the smelting-houses of Koluivan, begin their journey in March.

The stations which we saw to-day, viz. Achitsk, Bisersk, Klenofsk, and Kirgishansk, still bear, in the mouths of the natives, as well as in the Russian maps, the name of Kriéposti, or forts. The remains of earthen mounds which are traceable near some of them show that they were in old times nothing more than isolated intrenchments on a very moderate scale. Yet they proved quite adequate to the defence of the Russians against the native population; for, according as the frequent establishment of furnaces and smelting-houses drove the game from the woods, the aboriginal hunting tribes, unable any longer to find subsistence in their ancient homes, were obliged to leave them in disgust. Thus they deserted the districts wherein the Russians settled, and returned but once (with hostile views), in 1774, when the Kosak Pugachef, revolting against the provincial government, succeeded in inducing the native tribes to take a part in his predatory enterprises. At that

time, the intrenchments which are now fallen to decay were found quite sufficient for the troops which quelled the wide-spread insurrection.

August 31.—The first part of our journey to-day went over a somewhat undulating country, the lowest points of which were yet not below the level of Kirgishansk, while it rose in many places 200 feet higher. On the slopes of the hills, the fir-woods are almost totally cleared away, and luxuriant meadows take their place. The hay is kept out of doors the whole year round, till it is wanted for use. The ricks are secured from the moisture of the ground by a good foundation of brushwood. The quartzose conglomerate which we saw yesterday occupies but a narrow space from west to east; beyond it we again found the limestone.

About an hour and a half after we had left Kirgishansk, and as we were between the 14th and 15th verst-stone from that place, our guide informed us that we were on the boundary of Asia.

For the boundary between the two continents, the Russians have here very arbitrarily selected an inconsiderable chain of hills, which rises about 200 feet above the surrounding country (its total elevation being from 1250 to 1350 feet), and, running to the north, forms a secondary water-partition, such as we had frequently seen on the preceding portion of our journey.

From this place a small tributary runs south-westwards to the Ufa, while northwards, to the Chusovaia, flows another, named the Utka, the course of which we could discern, through the woody district of Grobofsk, about 200 feet below the level of the road. Both streams join the Kama.

In the days of ancient Greece, a point to which universal consent assigned so much importance would not surely have been left without some striking monument; for even on the isthmus of Corinth the bounds

of two comparatively petty provinces were indicated by a pillar, having inscribed on one side, "This is Peloponnesus, and not Ionia;" and, on the other, "This is Ionia, and not Peloponnesus." But the fact that, at the present day, the boundary between two great divisions of the earth is not thought worthy of any especial mark, may be hailed as a pleasing sign of the greater facility of movement which is now enjoyed by mankind.

Nevertheless, we left behind us, in a sportive mood, a memorial of our visit to this point, which, for the imagination, of the geographer at least, is not without some interest. We inclosed in a bottle a paper containing the names of the travellers and the object of their journey, written in Latin, and buried it in the wood on the south side of the road.

The idea of the discovery of this memorial at some distant date, was certainly very agreeable at the moment; but, at the same time, there was the less likelihood of its being realised, inasmuch as our Russian attendant, the old postillion of Kasan, took part in burying the bottle. To him the appearance of Germans, or Niemtsi, that is to say, foreigners in general, at this place, seemed a very remarkable phenomenon, and the more impressive, because war had once led him into their country; nay, it happened, singularly enough, that the arms which he was now wearing, he had partly borne, partly won, fifteen years before, at the battle of Lützen; and to-day he employed them in firing a salute, as he expressed it, to the memory of that distant land.

The dark colour of the compact limestone found here, and the veins of calcareous spar which traverse it in abundance, make it probable that a member of the transition formation is here met with.

The next station, Grobófskaia Kriépost, lies above 10 versts from this point, on the little river Utka,

mentioned above, the elevation of which we found to be 1380 feet. Among the stones lying about, we saw some blocks of a quartzose sandstone, of the same age probably as the conglomerate seen at Kirgishansk, and indicating the return of the stratified series.

On the road from Grobofsk to the smelting-houses of Bilimbayefsk (23 versts), near the last-named place, we crossed the Chusovaia by a low wooden bridge, and, at the works, we found ourselves 1320 feet above the sea. The red iron-stone, which is quarried at varied points around, is here smelted, and great cliffs have been laid bare for the purpose of making the roads, and of constructing the works, the buildings of which are large and handsome. The dense limestone, which incloses the iron ores, frequently gives way to true clay slate, so that there can be no doubt that it is a secondary formation which here presents itself.

We felt much interested by learning the identity of the ores smelted here, with that which is obtained by a very peculiar process in the neighbourhood of Irginsk, 15 versts west of Buikóva. There, as we were informed, holes are bored through the sand-stone wherever it makes its appearance, until traces of the ore are found. Where the trial proves successful, the workman fixes a stake in the hole, marking on it with notches the depth of the boring; and when a number of these borings near the same place, all promise well, a shaft is opened to obtain the ore. This is found at very various depths, from 28 to 105 feet; but it is manifest that the more productive tract extends from N.W. to S.E., or parallel to the direction of the main ridge of the Ural. The transition rock, which is here but thinly covered by the more recent formation, comes occasionally to the surface.

From Bilimbayefsk we ascended rapidly for two miles, and at the end of this distance attained an elevation of 1600 feet (290 feet above Bilimbayefsk), *the*

highest point on the road between Perm and Yekaterinburg. Here a true mica slate makes its appearance, which four miles further on, near the furnaces of Shaitansk, gives way to a clay slate traversed by veins of quartz.

About the middle of the way between Bilimbayefsk and the village of Reshötui, occur traces of a talcose rock, like serpentine; and then, a few miles further east, the first fragments are met with of Uralian granite, which is here a very quartzose rock, with greenish mica and little felspar.

As the road descends gradually from the highest point above described to Reshötui, many mountain tops of greater elevation are to be seen on both sides of the way, all covered to the summit with tall firs. Our guides had remarked that the snow lay longer in the spring on these summits than on the road; but on the other hand, they positively declared that on none of them did the snow remain throughout the summer: so that it is not only possible to make a road over the Ural, which rises nowhere beyond an elevation of 1600 feet, but it is manifest that in the neighbourhood of this pass, there is no mountain top which rises 500 feet higher.

As we approached Reshötui, we could discern large and roundish blocks of granite, covered with lichens, projecting from the ground in the dark fir-woods. The village now reached, 30 versts from Bilimbayefsk, stands at an elevation of 1190 feet.

From thence for two miles there is a gentle ascent, but after that the road descends with a more rapid inclination, which the traveller feels more sensibly, owing to the sharp edges of the granite, which is here split into large plates. These lying over one another, like the tiles on the roof of a house, have a very regular appearance, and, with a strike to the north, show a steep inclination to the east.

Halfway on this stage (10 versts from Reshötui), is reached, at an elevation of 850 feet, the wide plain which spreads round Yekaterinburg. Thus we found ourselves again at the same height, which we yesterday began to ascend at Buikóva, 120 miles west of our present position; nay, more — if we call to mind our earlier observations — at the same height which we already found prevailing at Kojil, 360 miles west of Yekaterinburg. And in crossing the great ridge of the Uralian chain, we rose only at one point, two miles east of Bilimbayefsk, about 700 feet above those mean limits.

The broad plain, elevated but 370 feet above the sea, which extends on both sides of the Kama, near Perm, and the plain, 630 feet high at Slatoust and Irginsk, were the only interruptions between Kojil and Buikóva, of that prevalent elevation. Further to the east, from Buikóva to Yekaterinburg, there is no instance of a similar interruption; for in that tract the waters have their course, either at the indicated level of 850 feet, or else, as between Klenofsk and Bilimbayefsk, they flow at a considerable elevation: the Biser, for example, at Bisersk, at a height of 910 feet; at Klenofsk, at 980 feet. At Grobofsk the course of the Utka has an elevation of 1380 feet, and that of the Chusovaia at Bilimbayefsk has a height of 1320 feet, after a run of about seventy miles, for the sources of this river lie nearly fifty miles south of Bilimbayefsk. Thence, for twenty miles, no considerable stream occurs, until at length the Iset at Yekaterinburg is reached, at the elevation of 850 feet above the sea.

It is this very moderate amount of the general elevation of the country, as it is expressed by the height of the beds of the rivers, which alone convinces one at last that the pass between Bilimbayefsk and Reshötui, really marks the highest part of the mountain

ridge; for thus we learn, that along a line drawn through Bilimbayefsk perpendicular to the chain of the Ural, the ground sinks at both sides of that pass.

Where the plain of Yekaterinburg is entered upon, the first rock that occurs is a stratified quartz, after which comes primitive schist alternating with granite in long stripes. The wood is here thinner than on the slopes of the hills. On the left of the road is seen the lake of Iset extending to some length, and close upon its eastern margin, the buildings of Yekaterinburg.

CHAP. IX.

MAGNETICAL OBSERVATIONS. — INDICATIONS OF TWO NORTHERN POLES. — DEVIATION OF THE ISOCLINAL LINES. — INCREASED INTENSITY. — HANSTEEN'S THEORY. — IRBIT. — EARLY TRAFFIC. — LAPIDARIES IN YEKATERINBURG. — PRECIOUS STONES. — THE OLD CREED. — LICENTIOUSNESS. — POPULATION OF SERFS. — ASPECT OF THE TOWN. — AN IMPERIAL FESTIVAL. — THE BIRD CHERRY. — JOURNEY NORTHWARDS COMMENCED. — CHARCOAL BURNERS. — LARCH-WOODS. — NEVYANSK. — ORIGIN OF THE PLACE. — ALAPAYEFSK. — MAGNETIC ROCKS. — GOLD. — POPULATION OF NEVYANSK. — WAGES. — HAY HARVEST. — CONSTITUTION OF THE MINING DISTRICTS. — RELICS IN THE CASTLE.

Aug. 31 to Sept. 2. — Upon reaching Yekaterinburg, we found that we were in possession of a complete series of magnetical observations, for thirty stations on our route hither: we were consequently desirous of a few days' leisure, to enable us to arrange the mass of data we had obtained, and determine what evidence they might afford for referring the phenomena noted to some uniform cause — the existence of controlling centres of attraction, or magnetic poles. It must be obvious, at the same time, that the value of such a theory can only be satisfactorily demonstrated by showing the coincidence of mathematical deductions, based upon the hypothesis, with the results of observation; but still, the juxta-position of the quantities actually recorded must suggest some idea of the course such investigations must take.*

* The expression, centres of attraction, is used here to avoid prolixity, and only as approximatively correct, with regard to the magnetic poles of the earth. Strictly speaking, they are only centres of the phenomena observed; and it is only in this latter sense that they are assumed to exist, in a limited and determinate number; without, at the same time, attempting to deny, that, in a dynamic theory, it might be necessary to suppose the number of them indefinite.

It was, in the first place, encouraging to observe the absolute uniformity prevailing throughout every modification under which the deviations of the magnet were examined; whether with regard to the dip, the variation, or intensity, there was evidence of their being continuously affected by geographical position; so that, with any given direction of route, the series of numbers, indicating the fluctuation of any one of these three elements, was found to proceed, not *per saltum*, but by gradual transitions.

This was, therefore, to be regarded as a proof of conformity to some general law, such as was assumed; instead of their being subject to the influence of several local attractive centres, as some recent inquirers have maintained. This fact seemed to justify our expectation of being able to refer all magnetic perturbations to the operation of a limited number of magnetic poles.

We had already brought this question within even narrower bounds. The time was evidently now come, when the problem of one, or two poles, in each hemisphere, was to be set at rest by actual observation; and every consideration, relating to this three-fold series of positive results, led us irresistibly to decide for two. Were we, for instance, to connect, by continuous lines, all those stations where similar angles of inclination had been noted between the needle and horizon, we should find that, all these lines, for the meridian of Metyeshka*, 49° 21′ east of Greenwich, would constitute exact parallels to circles of latitude; but that, east and west of this meridian, they gradually recede from these circles, towards the south, so as to present a convexity to the north pole of the earth. Were we, consequently, to assume a single magnetic axis for each hemisphere, lines of

* See p. 160.

similar inclination would form parallel circles round this point; and describe curvilinear figures, with apices towards the pole, on that portion, only, of a terrestrial meridian, intercepted between that magnetic pole and the adjacent geographical pole. It would follow, from this, that, in order to reconcile our observations with such an hypothesis, the centre of attraction, for the northern hemisphere, should be situate in the longitude of Metyeshka, but far to the southward of that place; and thus present an insuperable difficulty with regard to Parry's investigations, which gave positive indications of the existence of a magnetic pole in 255° 27′ east of Greenwich, and 73° north latitude.

There was, therefore, no alternative left for explaining the nature of the curve, assumed by the isoclinal lines, but to refer to some second point of concentration, situate eastward of our actual place of observation. Were such a point to be admitted, coexistent with that of Parry, it is easy to perceive, that there must be places, between the meridians of these two points, proceeding from whence, the observer would find the dip varying with the same expression, though he took his course towards opposite quarters of the earth. In fact, we should then have various situations where either pole, supposing it to exist alone, would produce the same inclination of the needle; or, what would be the same thing, a similar effect would be produced at the intersection of two isoclinal curves, having the same degree of inclination, but affected by different poles. Or again, if we conceive the isoclinal curve, produced by the joint influence of two poles, we must have a convex line, such as we found at Metyeshka, forming the demarcation between the range of the dominant attraction of either pole. The farther we proceeded towards the east, the less must be the disturbance

exercised by Parry's pole, upon the formation of the isoclinal lines, in regular circles, round the centre of attraction with which we were engaged. The constant south-eastwardly deviation of the lines of similar inclination, after leaving Metyeshka, furnished a complete confirmation of this hypothesis.

That there must have been some other forces in action, different from Parry's pole, was further evinced by our investigations as to the intensity of the magnetic power. Even under the meridian of St. Petersburg, the lines connecting those places where the magnetic intensity is the same (the isodynamic lines) were observed to show a convexity; and, on moving eastward, to decline so evidently to S. S. E., that the conclusion was inevitable, that the Asiatic pole must exert a preponderant influence upon magnetic intensity, much further to the westward, than it did upon the dip. Lines which, if the North-American pole alone exerted a magnetic influence in the northern hemisphere, must have taken a direction towards E. N. E., and, with our progress eastward, uniformly approached to a parallelism with the circles of latitude, were, on the contrary, found to tend to S. S. E., merging more and more into geographical meridians the farther we advanced.

The strikingly rapid increase of the intensity, as we advanced, upon the same parallel, was, in itself, a proof of our approach to a predominating centre of attraction; whereas, on the other hand, we had hitherto receded constantly, though slowly, from Parry's pole, and must have experienced a regular diminution of the magnetic force, if the Asiatic centre had not steadily counteracted that result. This most satisfactory proof of the existence of two foci of magnetic attraction in the northern hemisphere, as ingeniously conceived by Hansteen, was precisely what was desired; for, though some earlier remarks on the decli-

nation of the needle, in Russia, seemed to support his theory, there had hitherto been too few observations made on the dip, in that empire, to warrant such a conclusion; and the intensity had never been the subject of investigation at all.

The circumstance of one portion of the line, between Osáblikovo and Nijnei Novgorod (43° 24′ E.), showing no declination at all, while, from thence to Yekaterinburg, the eastern declination increased to 7°, was another powerful, though previously adduced argument, for the insufficiency of the hypothesis of a single magnetic axis; for, did such an axis pass through the American pole, the sphere of western variation must have extended 15° to the eastward of Yekaterinburg.

The lines of equal intensity and equal declination had, during the latter part of our journey, been so nearly perpendicular to our route, that our inquiries had been rather directed to their relative discrepancies, than to the determination of the figure of any one of them. Consequently, an expedition continuing this investigation northwards, would make a desirable supplement to our journey along nearly the same parallel of latitude.

At Yekaterinburg we found sufficient temptation to an excursion in this direction, from our curiosity to pay a visit to the northern Ural. The passes of Bilimbayefsk and Reshötui, as well as the general character of the immediate neighbourhood of the town, tend to give only a derogatory idea of this mountain chain; nor, in the absence of visible mountain summits, and considerable rocky masses, was the mineral riches of the neighbourhood, which struck our eyes at every step, less calculated to mystify us. Whatever we found worthy of inquiry — ores, precious stones, or colossal blocks of various geological character and formation, the only answer we

received was, that they all come from the mines of the Ural. Here, too, we were struck by an exception to the concurrence of the two characteristics, which particularly attract the notice of the natural historian. Notwithstanding the multiplicity of the mineral masses composing the exterior features of the country, the inequalities of its surface, even compared with the stature of man, are absolutely inconsiderable: this peculiarity is, of itself, sufficient to enable us to form important conclusions as to its geognostic constitution.

As the city of Yekaterinburg forms the key of the surrounding country, and is the capital of the mining districts of the Ural, we shall take this opportunity of introducing the reader to its inhabitants, and noticing their pursuits, and mode of life.*

We found here several officials, connected with the works on the Northern Ural, as well as traders from Tyumen and Tobolsk; some returning from the fair of Nijnei Novgorod to Siberia, and others on their way to an inferior mart, held at Irbit, 160 versts N. E. by E. of Yekaterinburg.

The mart of Irbit, which was formerly an emporium for the exchange of peltry and tea, between the Siberian tribes and the wandering hordes of the eastern parts of the empire, whose journeys often extended to Kiakhta, has latterly lost much of its importance. It was, at one period, visited by Greek and Armenian merchants; but upon the interdict against the importation of English goods, in 1807, it was gradually forsaken, for the more considerable fairs of Nijnei Novgorod or Yekaterinburg. The present commercial transactions of Irbit are confined to the supply of some of the most indispensable articles of European

* Yekaterinburg is considered the frontier town between the Severnuie Zavodi and the Yujnie Zavodi, the northern and southern mining districts.

manufacture to the neighbouring districts, in exchange (generally) for the produce of the chase. This traffic is, however, of little moment, and entirely in the hands of the Siberian traders settled here. The mineral productions of the Ural generally find their way direct to the fair on the Volga. This intercourse of the hunters of the north with the manufacturers of southern Asia, existed long before the Russians had penetrated beyond the Ural. Herberstein adduces on this point, the evidence of a Russian, who, previous to his time (1600) had visited the north-west of Siberia, and found that the hunting tribes were in the habit of procuring precious stones, in exchange for their peltry, from a people of swarthy complexion, who came in caravans from the districts on the Irtuish.* No one who has seen the sun-burnt Bokharian merchant, and knows his adventurous spirit of travel, can be at a loss as to the authenticity of this narrative. And earlier still, in the thirteenth century, Marco Polo gives us nearly a similar account of this traffic; which was carried on "with the darkest regions of the north," by means of sledges drawn by dogs, as he was informed by merchants whom he met with in southern Asia.†

The Siberian merchants, who extend their wanderings both to Kamchatka and the borders of the Icy Sea, make use of the same means of transport, both for themselves and their merchandise, with which we have become acquainted in the course of our journeys.‡

* Comment. rer. Moscovit. Basil. 1571, p. 82. B.

† Ramusio, Raccolta delle Navigazioni e Viaggi, vol. ii. fol. 3.

‡ Two Armenians, Grigori and Daniel Athanasov, have left us an account of a commercial journey, of sixteen years, from Constantinople to Semipalatinsk, through Kurdistan, Affghanistan, Kabul, and over the mountains of China and Tibet: it was published in Russian, in Sibirskii Vyestnik. I gave a translation of it in Berghaus's "Annalen der Erdkunde," for 1832. The name of their principal was Michailov, evidently of Russian origin. The Armenians, as well as the other commercial

The sheep is totally unknown among the Siberians as a beast of burden, though used for this purpose in Tatary.

The dealers in precious stones, cut and polished, present themselves as one of the first objects of attention to the visitor at Yekaterinburg. Men, women, and children, are met with at every step, offering bargains of these tempting valuables, either on the account of merchants who own and work the mines, or of lapidaries, who purchase the rough stones, at a very low price indeed. The distinctive names given to the stones in greatest request are very numerous. The topaz, the colourless transparency of which presents such a contrast to the honey-yellow variety found in Germany and Brazil, is denominated by the dealers here, heavy-stone. The amethyst bears the same name as in the rest of Europe; but all other varieties of rock-crystal receive the erroneous appellation of topaz, mistakenly applied to all, because the duller species of crystal were popularly known as smoke-topazes — duim-topas. Besides those, there are jaspers of various hues, which are fashioned into an infinity of articles by the artisans. All these stones are manufactured into ornaments, being cut and polished with great elegance; though less taste is displayed in the setting, which is generally of gold, as obtained from the smelting-furnaces in the vicinity, and consists of 7·1 parts of silver, 3·6 of copper and lead, and 89·3 of pure gold.

The cutting of seals, of amethyst, crystal, and jasper, is one important branch of the lapidary's art, which they have brought to great perfection, in the engraving of cyphers, or figures. Rough stones, too, enter largely into their dealings; aquamarine stones

tribes of Asia, including the Siberians, seem to have a natural disposition towards a wandering life, and to possess a capacity of adapting themselves to the habits of other people.

are imported from Mursinsk, and the mining districts of Nerchinsk: the latter are the most esteemed, and are distinguished by the peculiar striated texture of their transparent columnar crystals. We visited the workmen, while employed at their rude turning-lathes. They divide the softer stones with iron, but the harder with copper disks, which revolve on an axis, and are covered with powdered jasper, containing an impregnation of iron; but, for the more refractory gems, they have recourse to emery, procured from Germany. They likewise engrave cyphers and mottoes, in the Sclavonian tongue, on metal seals, which they sell to the Siberian traders.

The greatest neatness is observable in the dwellings of these artisans, who, even when in possession of considerable wealth, retain their native simplicity of dress and manners. They, as well as most of the more opulent merchants of Yekaterinburg, profess the ancient creed: the latter of these, however, adhere so literally to one of the dogmas of their faith, "that it is only what goeth out of the mouth that defileth the man," that they indulge in all sorts of sensual enjoyments; rigorously avoiding only certain indecorous language, and the use of tobacco.

The seceders from the orthodox Greek ritual have much increased in numbers, particularly in the district of the Ural, within the last few years: so much so, that the minister of Irginsk, who remembered when, a short time ago, there were but ten Raskolniks * (schismatics) among the workmen, had seen the entire population of 1000 families return to the old faith. Such of them as support a ministry, have had churches assigned to them, and receive pastors from the monastery of Irkisk, in the government of Saratov, or from Kiev. The numerous subdivisions of this sect,

* *Ras*, implying separation; and *kolot*, to split.

and their reserve with regard to their religious usages, afford pretext to the orthodox to charge them with practices which are too palpably absurd, or, at most, only attributable to the Bezpopovskie*, or anticlericals.

One of these charges — their want of good faith towards other sects — is disproved by the favours which their fidelity to the government has procured them. The other, that their mode of understanding the text which commands us to love one another, has led to an unrestrained intercourse between the sexes, may be less wide of the truth; as it is well known, that their females, at Tagilsk, will permit all sorts of familiarities to men of other sects, with whom they would, at the same time, think it a sin to eat or drink. There are other sectarians, however, to be found in Siberia, whose fanaticism takes quite the opposite direction.

Many names, given to these separatists, are merely derisive; as, for instance, Susliniki, because they are accused of getting drunk with suslo, or the first-drawn portion of the Russian beer. This body is also said to meet, in darkened rooms, after religious worship, and give way to the same excesses as are attributed to the Keres Indians, near Santa Fé†, and as were practised by the Agathyrsi, a tribe of southern Russia, in the age of Herodotus.‡ They are likewise taunted with offering worship to certain of their own community, who represent the Virgin Mary: others are termed Karuitniks, from the Karuita§, or cradle of

* *Bez*, without; and *popov*, a priest, *Russ.*

† Pike's Exploratory Travels through the Western Territories of North America. London, 4to. 1811, p. 342.

‡ Lib. iv. c. 104.

§ In some verses sung at the festivities held at Christmas and the New Year, reference is made to the Karuita; but rather in an auspicatory sense, than with a view to a mode of penance. This word, however (which is somewhat obsolete), may have been chosen for the sake of its

lime-bark, in which they lie motionless to do penance: the Molokani are distinguished by the extraordinary severity of their discipline: this has sometimes been carried so far, that there are inhabitants living at Miask, who have witnessed the death of a Molokan, on a pile which he had raised and fired with his own hands.

The elegance of the houses in Yekaterinburg, which are of stone, would do credit to the merchants of many European cities; while their internal comfort is fully in keeping with their exterior: that many of their owners are still serfs, and obliged to pay an almost princely tribute to their lords, is hardly considered a grievance here.

The rest of the population consists of the officers connected with the mines, who, though still distinguished from the forementioned class, in religious and social usages, nevertheless live in friendly intercourse with them. Those officers are frequently of German origin; but, as their families have been, in many cases, long settled in the country, and they themselves are generally sent, for their professional education, to St. Petersburg, they rarely retain any traces of their ancestral habits or language.

The external aspect of Yekaterinburg has much that reminds one of the manufacturing towns of Europe. On the south-eastern bank of lake Iset, the buildings are spread over an extensive plain, which is connected with the city by a handsome bridge over the river of the same name; here the government

assonance with koruist (gain, &c.), which is often pronounced karuist, particularly by the people of Moscow, as the two first lines of the song are (in Russian),

"Na karuitye sizhu,
Ya koruisti glyazhu."

"I sit in the cradle,
I watch the chance," &c. &c.

magazines, mills, factories, &c. are situate, as well as a guard-house, all built in a handsome style, and enclosing an extensive square, or market-place. On the other side, and somewhat more elevated in site, are the rows of wooden huts for the workmen, with houses of stone for their overseers.

The principal part of the town, however, lies on the right side, to the south of the square, with wide and elegant streets and spacious stone mansions, inhabited by the merchants, already noticed, and the proprietors of mines. In this quarter, too, stand the public granary, a public sale-room, a convent, and several churches. Log-houses are scarcely to be seen.

The streets are straight, but unpaved, with log-ways, however, at the sides for foot-passengers: the principal street runs parallel with the river, and is crossed by numerous smaller ones, which lead directly to the bank of the Iset, thirty feet lower down.

There is a military post on the N.W. of the city, formerly intended to give protection to the inhabitants, but now the soldiers are principally occupied in preventing evasion of the tolls, which the merchants who visit Irbit, are obliged to pay here, and in looking after exiled criminals, who pass through the town: contrary to the prevailing arrangement in Russia, this garrison is composed of the aboriginal inhabitants of the country.

On this side the city is enclosed by a wood of pines; but no wide cuttings have been made in it, except on the sides of the road leading towards the north.

At the distance of a verst higher up the river, we come upon the rocky borders of the lake, which is of an oblong shape. The height of the declivity is no greater here than where the river runs through the town; but it exposes to view perpendicular seams of

chlorite slate, about three inches thick, the northerly strike of which is very discernible.

We had now an opportunity offered us by our friends in Yekaterinburg, of pursuing our journey to the mines, in company with Professor Kupfer, of Kasan, and one of the proprietors.

September 3. — This day being the anniversary of the accession of the reigning Emperor, was kept as a religious festival: it may be well to explain that the distinction between ecclesiastical and imperial festivals, as observed throughout the Empire, lies chiefly in the name.

As the same ideas prevail, upon this subject, among the adherents of the ancient and modern church, the women of the old creed were seen on this occasion dressed as for ordinary worship, in their peculiar dark-coloured fatà, thrown over the head, and hanging down upon the shoulders. That the name of this article of dress cannot be of Sclavonian origin, is rendered more than probable, by the letter with which it begins; *f* being only found, as an initial, in two or three of their primitives; and a similar usage prevails, particularly among Catholics, in several districts of Germany, where this article of dress is called *haik*, from a Syrian word, as is supposed, by which it was known to the Crusaders.

The in-door dress of these women is the ancient Russian sarafan, and a covering for the head, called a kakoshnik, which, with its broad and staring border, is not unlike the glory, as it is called, which is represented upon the heads of saints. This head-dress, which is sometimes almost covered with jewels, is worn by married women alone; while long plaited tresses (kosi) remain the distinction of unmarried women, who do not cover the head. The dressing and combing of these braids is an occupation of such importance, on festive occasions, as to be the subject

of frequent allusion in the popular songs. On the other hand, the flowing locks of the young men is quite as much their special characteristic in poetic language. In this view of the distinctive costumes of the sexes, it is remarkable that the tresses of the female are always described as auburn, while the locks of the man are invariably black; as are also the eyebrows of both; so that, dark-browed (chernobrovin), is an epithet constantly applied to either sex. Can it be, that this merely indicates the *beau idéal* formed in the national mind, or, could this difference between the sexes really have formerly existed in this race?

In the public gardens, in the middle of this city, the walks are bordered by rows of tall bird-cherry trees (Prunus padus), which are indigenous to this region. The juice, as well as the pulp of the berries of this tree, are treated by the Bashkirs in a manner which so perfectly illustrates a passage in Herodotus, that I cannot do better than give this author's words upon the subject. "The fruit resembles a bean (κύαμος), and has a hard kernel; as soon as they are ripe, they are pressed in long leathern bags, and the thick and black juice which flows from them is drunk, either alone, or mixed with milk; the remaining mass (τρὺξ) is kneaded into cakes, between the hands*, and used as food."

It is the custom at Yekaterinburg, as in other Russian towns, that, on every solemn holiday, the principal inhabitants shall attend the person of highest rank among them to his house, when divine

* Herod. lib. iv. c. 23. This I consider to be the meaning of the Greek παλάθας συντιθέασι, the word παλάθη, a dry flattened fig, having probably some connexion with παλάμη, the flat of the hand; we detect here the ancient and most simple mode of kneading, between the hands. We shall see, lower down, how the Kamchadales prepare these "παλάθαι." The name of the bishbarmak — five-finger cake — of the Siberian Tatars and cognate Mohammedan tribes has probably a similar derivation.

service is concluded. This mark of respect was, upon this occasion, paid to M. Ossipov, the chief-overseer of the mines, who acknowledged the attention by a public breakfast.

To M. Ossipov I was afterwards indebted for the loan of a boring instrument, from the government stores, which I found extremely useful, in ascertaining the temperature of the earth, in various parts of Northern Asia, particularly at Beresov, Tobolsk, and Obdorsk. This gentleman was a good systematic geologist; but confessed that he had much difficulty in reconciling the stratification of the Ural with existing theories; arising from the dispersion of the ores over an extensive space, as well as the extraordinary richness of many detached metalliferous seams of rock.

A public ball, given on the evening of this day, and at which the dancing was accompanied with appropriate songs *, obliged us to defer our excursion till

September 4. — When we started for Nevyansk; passing, first, through a pine-forest, which extends as far as Puishma, whence we continued our journey to Mostováya, where we changed horses. This village owes its name to the log-road, or succession of bridges †, by which it is approached over a rugged plain, intersected by little streams and coppices of birch. Notwithstanding a fertile soil, the inhabitants hardly trouble themselves with any branch of industry, beyond the supply of charcoal for the mines; of which every male peasant is obliged to furnish 100 korobki yearly, each containing about 75 cubic feet (English). By arrangement among themselves, however, they sometimes engage with one another for a pile of wood ready felled, paying 100 roobles

* These songs are distinguished in Russia as plyasovie pesni, dance-songs.

† *Most*, bridge, *Russ.*

for one producing 80 korobki; so that the entire exaction from a single peasant amounts to 125 roobles yearly; from this must be deducted the value of the rations, to which the serfs of the Crown, as well as of other proprietors, are entitled.

From Mostováya to Shaidurikha we found the ground strewn with sharp fragments of white quartz. Wherever a rivulet appeared we saw heaps of this quartz, and green schistose rock prepared for washing out the particles of gold which they contained. The largest of these establishments is situate on the road, where it crosses the valley of the Ayat. From hence to Nevyansk the larch was occasionally seen in the forests; these trees are also met with on the southern Ural, at Slatoust.

The larch is called listvennitsa in Russian, in allusion to the arrangement of its acicular leaves *, and is highly valued for its power of resisting the effects of moisture, besides possessing other properties which its employment upon the Ural has served to prove. It is found to produce a high degree of heat †, though not a brilliant light. For tile-kilns it is preferable to all other sorts of wood, but is never used for charcoal; partly because, when once kindled, the intensity of its heat is too great to be checked till all the woody fibre of the pile is consumed; and partly because, when charred, it flies before the bellows, and escapes from the furnace: neither is it ever used here in the house, on account of the pungent and stupifying qualities of its smoke; nor in rolling out iron plates, for it soils the metal.

A column of flame from a smelting-house helped to guide us to Nevyansk, which we reached at nine

* *List*, a leaf; and *venets*, a crown, *Russ.*

† In this property the birch (Betula alba bereza, *Russ.*), comes next; then the Pinus abies (yel, *Russ.*); and last, the P. sylvestris (sosna, *Russ.*).

in the evening. The works at this village belong to the family of Yakovlev; but, as none of the proprietors are resident, we were admitted into their ancient seat by their bearded vassals, who conducted us through some large and dreary chambers which had not been inhabited for more than a century, though still richly and commodiously furnished, in the Dutch taste of the reign of Peter the First. A few minutes saw us at supper in a corner of the saloon, — our table overspread with a variety of good fare and delicious wines,—Madeira, Champagne, and Hungarian kinds. This profusion, suddenly displayed in a long-deserted abode, had something in it sufficiently startling, even without the presence of the antique and grim-looking figures on the walls.

The assertion which has been frequently made, that this is the oldest foundry on the Ural, is positively disproved, by an ukase of the year 1701, preserved in the archives of Tagilsk, which directs the Voievod of Verkhoturie, to despatch all the machinery and workmen from the imperial foundry at Alapayevsk to Nevyansk, under the orders of Nikiti Dimidov of Tula. Before this period, the Swedish prisoners, taken at Pultava, had been employed in constructing a dam across the Neva; but the works had been discontinued, and were not completed till resumed by the "iron-master from Tula." This Nikiti Dimidov was the ancestor of the present noble Russian family of that name. From him the works at Nevyansk passed to Carl Savich Yakovlev.

The prosperity of the mining districts dates from the reign of Peter the First, who resigned all the rights of the crown in favour of the speculators in their produce; merely stipulating that they should confine their exertions exclusively to promote this department of the national resources. Under the government of Catherine, however, the introduction

of fiscal courts (Kazennie palati), appointed to the control of the mining operations of the empire, had a marked effect in checking the supplies of metal: by the enactments of Paul the First, the ancient privileges of the mining interest were so effectually secured, as to give to many of the private establishments on the Ural, the importance, almost, of independent states.

The smelting works of Alapayevsk are eighty-five versts E.N.E. of Nevyansk, and 100 E. of the nearest point of the ridge of the Ural. This distance, however, was not chosen for the first attempts at raising productive ore, so much from any difficulties attending a nearer approach to the grand range, as from the peculiar character of the primitive and transition formations in these mountains, which exhibit an unusual extent of metalliferous strata.

September 5. — This day being clear and mild, I proceeded to make my magnetic observations; for which I chose a mass of rock, just opposite the castle, and from 100 to 150 feet above the level of the Neva. This rock consisted of stratified serpentine, dipping almost perpendicularly to the W.N.W., closely veined with fibrous amianthus, and containing large particles of ligneous asbestus, and shaly talc; and I had chosen it as a much more favourable site, for my purpose, than the plain below, where piles of ores and iron implements might exert a disturbing influence on the needle. The result was quite unexpected: the quantity of the dip put it beyond a doubt, that the magnet was powerfully affected by the presence of the serpentine, which rock had never been suspected of this property before. Analogy, upon which we had hitherto learned to place the most implicit reliance, gave the inclination of the magnet, at Nevyansk, nearly 70°; whereas, our actual observations reduced it to 66° 37′ 69″. Professor Han-

steen, who was conducting his operations on the plain below, found it much nearer the normal range.

This excited my attention; and I soon discovered that, not only protruding masses of the serpentine, but even detached fragments, had sufficient effect upon a small magnet, in their vicinity, to reverse its direction altogether — the elevated points of the rock invariably and distinctly repelling the northern and depressed pole; a proof, that the distribution of forces in the mass of rock was the opposite to that observed in upright rods of soft iron, in consequence of the independent action of terrestrial magnetism. Though the most careful examination could discover no visible traces of any of the ores of iron interspersed in its substance, still, there can be little doubt that this metal exists, in a state of imperceptible division, throughout the rocky mass. The constitution of the rocks of serpentine, found on Haidberg in the Fichtelgebirge, and the neighbourhood of Wartha, and the Silberberg, seem to strengthen this conclusion; for the beds and veins of pure magnetic iron, which are found at particular points of that formation, afford a strong argument for its existence in other points, though in a state only appreciable by the magnet. The extraordinary accumulations of magnetic, and other iron ores, which shoot out towards the eastwards, in the midst of the micaceous transition formations of the Ural, will frequently pass under our notice, as one of the most important objects of the mining operations; still, it is incontestable, that, apart from these larger deposits, other minutely disseminated, and imperfectly oxydised ores must be incorporated with the general mass of the chain; for, upon washing gold, or platinum, a delicate magnetic property is always discoverable in these metals, after their separation from the talc and greenstone. *

* The specific amount of the attractive forces of the serpentine at

Nevyansk, as well as all the older establishments of this kind in Russia, contrasts strongly with German mill-works, by the boldness and simplicity with which water power is applied to mechanical purposes: no long water-course is ever dug to raise the level, but an entire valley dammed up at once to the height of fifteen or twenty feet, from which a gigantic wooden caisson conducts the water required to the forges of an entire village at once, through lateral spouts. Much natural ingenuity is evinced, too, by the manner in which one of the large foundries in this vicinity is supplied with water: the roof being so high as to prevent its direct course to the wheels on one side of the building, it is conducted in pipes under the floor, and reascends to a wooden tank from which it plays upon the machinery.

In the construction of these several conduits, the Russians are exceedingly expert. Larch is the wood most commonly employed, as it is generally water-tight, under the greatest pressure; the edges of the parallelopipedons which they form are cut out of the solid piece, so that the joints are on the sides, while the entire is held together by massive iron hoops. It is only rarely that cast iron pipes are used for water, though very often for conveying condensed air, sometimes even a distance of 400 or 500 feet from the bellows to the furnace.

The apparent complexity of these conduits as they are laid to supply these two elements of activity and power to the forges, produces the impression that all the necessary apparatus and machinery had been erected for the works before the moving principle had been thought of; and the application of the che-

Nevyansk will be given in another place. It is at the same time remarkable, that the rock, which reduced the dip by more than 3°, should have left the intensity almost unaffected. I once observed a similar effect produced by the Northern Lights at Beresov.

mical and mechanical properties of fluids to this purpose had been the after-thought of some bold and enterprising mind. It is no less interesting to find, too, that some of these contrivances, though introduced where their inventors had no clear idea of the difficulties they had to surmount, have been attended with complete success: thus, for instance, it has been found by experiment on one of these pipes above mentioned, that the elasticity of the air, immediately on leaving the bellows, is to the same at the distance of 420 feet in the pipe, as 83 to 59, a much more favourable ratio than was expected; and this, too, with the disadvantage of sudden variations in the bore*, by which the elasticity, as communicated by undulation, must have been reduced.

The ore is procured at a short distance from the furnaces, where a shining mass of red iron-stone appears just at the surface in a bed of clay, the colour of which varies from green to yellow. This bed is cut by a seam of variegated limestone, running in the direction of the grand Uralian range, and in contact on either side with a somewhat loosely schistose serpentine: two or three openings which have been made upon a northern (N.N.W.) offset of this bed have shown no traces of the limestone.

The smelting-houses here obtain a supply of ore from Nijnei Tagilsk, also of a peculiar sort of magnetic iron-stone. It is distinguished by the remarkable crystalline structure of its grains, which are agglomerated in irregular dodecahedrons, of the diameter of 0·8 or 1, 5 lines. It is understood to require a sharp roasting before it goes into the smelting furnace, otherwise it collects into lumps without being reduced; and layers of unsplit pine-wood are usually intermixed with it when roasting. These layers are

* By flanges in the inside for the valves.

continued alternating, about every three feet and a half, with the layers of ore, which are seven feet thick, till they reach a height of thirty-five feet upon a surface of 2500 square feet. A cruciform opening is left in the pile of wood for the passage of air, and the entire is well secured with a strong framing of timber. Whole forests are set apart for this extravagant, and perhaps unnecessary, operation; for the magnetic properties displayed by the iron, even after this process, prove that the oxydation can, after all, have been but imperfect.

In the production of the ordinary crude iron, the Tagilsk and Nevyansk ores are smelted together, with an admixture of sand and ferruginous argile; but Nevyansk is found to offer the best material for cannon and balls, as the magnetic iron-stone of Tagilsk furnishes a metal too hard for such purposes. In this case, the crude iron is smelted a second time with a portion of lime. The production of bar-iron, however, is the most important branch of the iron-founder's occupations.

Gold is likewise an object of search in this neighbourhood, and has been sought with some success. At about two versts from the village, the greenstone, which underlies the schistose rock of the district, is cut by two veins of quartz. The matrix of these veins is the white, soft, granitic formation, which bears the name of Beresite on the Ural, and which we shall have farther occasion to notice when we come to Beresov, though a full and circumstantial examination of the geological characters of both is still a desideratum. The gold is found here, as well as at Beresov, in a brownish ironstone, which occurs, either in crystals, in the offshoots of the quartz veins, or in a state of minute division in the contiguous Beresite.

This stone had been raised, for some years, by

means of shafts, from two to four sajenes (14 to 28 feet) deep; but this plan is now given up, for the more profitable one of washing the gold from the shivered and decomposing rocks of the environs. In some of the dry chasms that traverse the valley of the Neva, for instance, a very rich stratum of argillaceous earth is found, containing scattered fragments of angular quartz and greenstone; and, as this is only covered with a thin layer of turf, the gold may be reached without difficulty. The many spots of this character, where gold is obtained in the surrounding districts, seems to justify the notion entertained here, that the reddish earth, which sticks to the wheels of the waggons, on the grand road over the Ural, would yield a portion of gold. No platinum has yet been discovered at Nevyansk; but, judging from analogy with other places, in the vicinity of which it is found, there can be no reasonable doubt of its being some day obtained from the disintegrated greenstone.

The greater part of the inhabitants of Nevyansk, 10,000 in number, are serfs, most of them, probably, descendants of exiles assigned by the government to the proprietors of the furnaces, and all of the ancient church. I give, however, a tradition as to their origin, which I learned from the mouths of some of the natives themselves. There is still to be seen in the vicinity of the castle, a tall stone tower, to which the only access is by a decayed flight of steps. In this tower, the early proprietors of the mines are said to have concealed and protected the fugitive criminals, whom they also engaged to work in the foundries, contrary to the injunctions of the government. In fact, we have a somewhat similar event actually recorded in the history of Siberia, when Yermak, who was looked upon as a freebooter, and his companions were taken in 1580 under the protection of the Stroganovs, who had settled upon the Chusovaia.

This act was angrily resented by the then Tsar, Ivan Vasilievich; nor was it till after the glorious issue of Yermak's subsequent expeditions, that the Tsar could be induced to pardon the contumacy of Stroganov and his other rebellious subjects.

The tradition, however, could only have reference to the Brodyagi (vagabonds, from *brodite*, wander; *Russ.*), who were more numerous in former times than at present, and who were mostly runaway serfs. The astonishing extension of Russia is, in a great measure, due to this circumstance; for when the feudal system was but recently introduced, and consequently more irksome to the republicans of Novgorod, who had imbibed an irrepressible spirit of adventure, it was not unusual for entire communities to take refuge from their Kniases and Boyars in the surrounding countries, where they hoped to be beyond their reach.*

Most of the serfs, in the private works, seem content with their lot; which may be partly owing to the acknowledged care bestowed upon them by their masters. Notwithstanding the hereditary tenure of their domains, the zavodchiks (proprietors of factories), seem less possessed than the other nobles of Russia, with the blind persuasion of a difference in race between themselves and their serfs. Such prejudices appear to be the offspring of indolence alone, and incompatible with a state where influence and power is to be maintained by activity and energy.

At four in the morning, the entire of the labouring population, — that is, all males of upwards of twelve years old,—assemble at the office of the works. The women may take a part, or not, in their labours, as they

* Captain F. Lütke, in his "Four Voyages in the Icy Sea" (Petersburg, 1828), has shown that the settlement of the Russians at the mouth of the Dvina in the eleventh century, and their subsequent discoveries in the Icy Ocean, were owing to similar political changes.

think proper. The tasks of the day are then assigned them by the overseer (prikashchik); but so that the *masters*, in any process, have always the same work to execute, while the occupations of the rest may be different every day. The lists of the workmen engaged are checked over, regularly, by the intendent (upravitel) of the works, and despatched to the proprietor from time to time. The hours of labour are from half-past four to eleven in the forenoon, and again from twelve to seven in the evening; and the wages are 8¼ kopeks (less than a penny) a day, or about nine Prussian dollars per year. Extra labourers, women and girls, receive ten kopeks; but boys, only six or eight. Such remuneration would be totally inadequate to the incessant labour required, but for the rations from the stores of the establishment, to which they are entitled besides.

Following the regulations of similar institutions, which are immediately dependent on the crown, the allowance, for a married person, is two poods (80lbs.) of rye meal per month; this is called the Payok. Males, under sixteen, and unmarried women, receive only the half of this; an arrangement which is necessarily an inducement to early marriages. The women are often married at seventeen; still a large family of children is so rare among them, that five is looked upon as an unusual number.

Aged persons, when past their work, only receive this allowance when they have no children. It is also to be observed, that, though this quantity is generally given, still certain drawbacks are made, in many instances, from the monthly wages, varying according to the price of rye, and the earnings of individuals; so that, under unfavourable circumstances, an able workman may have but a little more than twenty-two Prussian silver groschen (two shillings) per month, to procure all other necessaries but meal.

According to the present price of corn here, this sum is worth fifteen times as much as it would be in Germany: and besides, the work-people have the additional advantage of buying nearly every article of their consumption, at public stores, supplied and conducted upon a system of the most judicious disinterestedness. Markets are also held, several times in the year, for the sale of goods made by the free artisans, who are under the supervision of a basarnik, or clerk of the market.

The workmen have each his own house; and several have horses, cows, and other domestic animals besides, for which they have the right of taking hay — their only fodder, on the common field. At hay-time, the whole population is, unless in very extraordinary cases, discharged from the factory, and proceed into the surrounding woods, where they sometimes remain encamped for six weeks. The time allowed by law is only twenty-eight days; but, as they are often delayed by the weather, it is commonly found necessary to extend this indulgence. The importance attached to the hay-harvest is owing to the value of the services of the horse, both to individuals and to the community at large.

Immediately after the conclusion of this business, in which all have an interest, the period of activity for the iron-works returns — smelting, forging, and preparing for the exports of the ensuing spring. This branch of service, as connected with the establishments on the Ural, will be noticed hereafter.

The free hired artisans prosecute their labours in another department — the manufacture of rifles, which find a sale in every part of Siberia. The barrels are thoroughly welded, and carefully bored, and rifled; but too thick for the caliber of the piece. The ordinary price charged to the traders is ten roobles each;

the locks come from Tula; but are procured immediately from Nijnei Novgorod.

The people employed in the offices connected with the works, receive from 30 to 400 roobles (from 5*l.* to 60*l.*) yearly salary.

The peculiar constitution of the mining districts precludes much direct intercourse with the general government of the country. All ordinary matters of dispute, or transgression of the laws, are left to the adjudication of the zavodchik, or his bailiff; and it is only in extraordinary cases, that reference is made to the Zavodskoi Ispravnik (director of mines), at Nevyansk. This officer is appointed by the central board of mines (gornoe pravlenie) at Perm, and is bound to see and report that the yearly produce of the mines is in conformity with the engagements originally entered into with the government. Each proprietor pays 2·5 roobles capitation tax for every male employed, besides, commonly, a composition for exemption from military service. In cases where the recruits are actually drawn, the wife and future children of the recruit are entitled to their freedom. As already remarked, the mining population is exclusively Russian. The aborigines, whether Bashkirs or Voguls, have never yet been induced to engage in such labours. The only exception to this occurs in the government of Perm, to the west of the Kama, where the Finnish branch of the Permyaks, who are nearly allied to the Voguls, have formed a permanent settlement, under the family of Stroganov.

One of the relics preserved in the castle of Nevyansk, is the carriage in which one of the princes, Gagarin, made a journey from St. Petersburg to the Ural, in the time of Peter I. Its windows are of mica; the wheels unusually small, not more than three feet diameter; it is considered here a work of extraordinary magnificence. The luxurious entertainment,

which we received at this castle, may be in some measure accounted for by the fact, that a very considerable portion of the yearly expenditure of the overseer is entered under the head of "provisions, liquors, conveyance, &c., for useful friends;" so that the general hospitality of these little mercantile principalities, which has now become a sort of law, may have originated in speculative attentions to travelling merchants.

CHAP. X.

DEPARTURE FROM NEVYANSK. — FORESTS. — SIBERIAN CEDAR. — ITS NUTS. — HUMBLE VEGETATION. — LARGE-TAILED SHEEP. — TAGILSK. — PRODUCE OF THE FURNACES. — GOLD AND LEAD. — VARIETIES OF CRUDE IRON. — COPPER WITH IRON. — LACKERING AND PAINTING. — CLIFF OF IRON ORE. — GREAT MINERAL WEALTH. — ENCREASED TEMPERATURE OF THE WELLS. — IMPORTANCE OF THIS PHENOMENON. — ORIGIN OF THE METALLIFEROUS DEPOSITS. — TWOFOLD SUBMERSION. — THE WOODS OF THE DEMIDOV FAMILY. — CLIMATE OF TAGILSK.

At four in the afternoon, we left Nevyansk for Nijnei Tagilsk. Every trace of active life disappears immediately after leaving the town; but still, the preservation of the monotonous gloomy woods, through which we travelled for fifty versts, is an indispensable condition of the thriving existence of the miners. The pine (P. sylvestris) and larch were predominant; though towering birch-trees were frequently seen, and when about midway we observed, too, for the first time, the Pinus cembra, the Arve of the Swiss, which, under the name of Siberian cedar, is an object of no little pride to the Asiatic Russians. It is quite unknown on the southern Ural, nor, westward of our present meridian, is it ever met with in the north. Here, at 800 feet above the sea, we are struck with the sudden re-appearance of a family of trees, which are found on the Swiss Alps at an elevation varying from 4000 to 7000 feet, and no vestiges of which are observable between those mountains and the eastern slope of the Ural. From this line, onwards, we find them flourishing in such size and beauty, as to deem it almost superfluous to inquire after their native place; but, on the borders of these

two widely-separated districts of their naturalisation, the enigma of the dissemination of organic tribes presents itself, in all its glaring perplexity. Let us assign the first individuals of the Pinus cembra to Siberia or Switzerland, as we will, the mystery still remains, how successive colonies of the family could have spread across countries, apparently as fatal to their existence as water is to land animals. The absence of certain classes of vegetation is more plausibly accounted for than their presence, in certain regions; but this only renders their dispersion across countries, which now form a barrier to their continuity, a more embarrassing speculation.

We had already noticed large quantities of small cembra nuts in European Russia, and observed their close resemblance to the pistachio nut. Both these seeds have nearly the same size and form; except that the husk of the former is less smooth, and scarcely to be separated from the brown rind of the external scales of the kernel, which has nearly the same flavour in both; but the cuticle in the northern fruit contains a resinous juice, while it has a fine balsamic character in the Bokharian nut. The passion for these oily nuts is so great, even here, as almost to endanger the future existence of the plantations; a pood of them is often sold for only twenty kopeks; and even trees are sometimes cut down merely for the sake of the fruit.

It is only owing to their fortuitous exemption from drying winds, that these countries have been preserved from the continual diminution of the fertile portion of the soil, which has caused so much consternation in the Swiss mountains during the last few years. In that country, the tendency of the mountain air to promote the decomposition of vegetable matter is remarkably limited; while here, on the contrary,

this process is always going on with striking rapidity, as well in the mineral as in the vegetable kingdom; so that even the very beds of yellow clay, which separate the strata of micaceous and argillaceous rock, are evidently the result of atmospheric influence. The decaying vegetation becomes thus converted into a fertilising mould, which is spread over the surface of the land by the action of the rains or streams. The germs of future plants, too, are readily detained by the mineral débris, on the plains, which, on account of their low temperature, check the evaporation of the moisture supplied by the atmosphere. The hollows in the marshes become rapidly overspread with a matted covering of the Ledum palustre, Andromeda polifolia, and A. calyculata.* Yet the alpine rose never makes its appearance here; although the temperature, congenial to the Pinus cembra, is that in which many varieties of Rhododendron flourish.

In the middle of the forest, just before reaching Shaitansk — the only open spot on this day's journey — we came up with a flock of sheep, tended by a Russian shepherd on horseback. They had extraordinarily thick tails, without any hair on the end; crooked horns, lying close to the head; and long pendent ears: their direct descent from the fat-tailed Kirgisian sheep was not to be mistaken; though the peculiarities of this race are never found permanent in their original purity here. The scanty and bitter herbage of the steppes seems so essential to their characteristic conformation, that even the Kirgisian sheep introduced into the districts of Orenburg, south of the Ural, lose the development of the tail, after a few generations. They are said to degenerate less

* The Arbutus alpina (Arctostaphylus alpina, *Kunth*), too, is, according to the elder Gmelin, seen in the district of Verkhoturie. I discovered it afterwards myself on the slope of the Marekan mountain, near the shore of the Sea of Okhotsk, Jan. 27. 1829.

rapidly among the nomadic Bashkirs, more remote from the mountains.

On the west, during the day's journey, there was observable a rapid elevation of the country. Continuous rock was of frequent occurrence, with hornblend and feldspath succeeding the serpentine of Nevyansk; the two constituents of this rock appeared, at first, imbedded together in large crystals, forming true syenite-porphyry; next, more intimately blended in greenstone; and, lastly, running into schistose greenstone, at N. Tagilsk. Southward of Shaitansk a granular quartz rock, with scales of green mica, is frequently met with, and seems to form the line of separation between the porphyry and schistose greenstone.

This range of heights separates the high road from the river Tagil, on the west, which runs parallel to it, in a north-westerly direction. At Shaitansk, the valley of the river opens to the S.W.; and on the opposite side, it is joined by the Cherna, which enters it by a chasm which extends also through the hills, on the right. It was on the crest of these hills, near the head of the chasm, that we afterwards discovered a very productive bed of grains of platinum. The rising grounds, bounding the valley of the Tagil, sink gradually down to the river, forming, not a disruption of the adjacent rocks, but merely a depression in their stratification; as is proved by the dip of the formations on either side.

September 6 and 7. — As there was no member of the proprietor's family resident at Tagilsk, we were obliged to solicit the hospitality of M. Shvetzov, the agent of the mines, by whom we were received with every mark of attention. The smelting furnaces, with their dependencies, occupy a space of five square versts. A stone church, and the residence of the proprietor, stand on a small eminence of greenstone; while the forges, and dwellings of the workmen ex-

tend from the river to the foot of a hill, on the westward, called Fox Hill (lisaya gorà).

Both copper and iron are worked at Tagilsk. Besides this establishment, there are eight others in the district, belonging to the family of Dimidov, who own altogether six smelting furnaces, and numerous forges.

The several factories are under one central direction. The ores are roasted here, before smelting, as at Nevyansk, though consisting principally of magnetic ore and brown ironstone, with occasionally a slight admixture of iron pyrites. The furnaces will sometimes contain 800,000 poods each; and, as one cubic sajene of pine wood is required for 4000 poods of ore, the temperature of the mass, in the operation of roasting, may be calculated to be raised to 2340° R.*, but as, even then, the ore remains decidedly magnetic, it must be presumed that the actual heat is never so high. The experiment, upon a small scale, has shown that the magnetic properties of ironstone are less easily destroyed by heat than those of steel; still, as 320° R. produces a loss of two-tenths of its intensity, it would follow, that at the temperature it might possibly reach in the furnace, all traces of magnetism would disappear.

In the south Ural works, heat is economised by passing the flame, issuing from the smelting furnace, over the horizontal layers of the ore, as prepared for roasting: it is then conducted through a chimney, of perhaps thirty feet in height, on which it deposits the minute particles of ore carried off by the revolving column of smoke, in spiral ridges, which have a most illusive resemblance to the tubular hæmatite found in nature, and furnishes another instance of the

* That is, assuming the specific heat of magnetic iron at 0·16 of that of water, and that the heat communicated to a like weight of water is 2880 R.

analogy between the products of the smelting houses and several fossils deposited upon open fissures in the earth.

The proportion of the magnetic to the brown iron ore, as used here for gun-casting, is five to four; while crude iron for other purposes is smelted from the pure magnetic ore, and receives, besides, the twentieth of its weight of fusible spath, from the west of the Ural. The average daily produce of metal from each furnace is about 17,500 lbs. (Prussian), or fifty three hundredths of the entire ore used. The furnaces are about thirty-five feet high, and fourteen in diameter, at the widest part.

The stones for the lining of the furnaces throughout the northern Ural, are got at the mouth of the river Rezh, 140 versts east of Tagilsk. The range of hills, where they are quarried, bears the name of Tochilnaya Gora, or, Grindstone Mountains, and is divided into as many compartments as there are mining works. The stone consists of exceedingly compact granular quartz, with greenish micaceous plates, on the interstices of which a beautiful crop of crystals of chromate of lead is seen to shoot.

This hill (the Tochilnaya) seems to throw considerable light on the conditions under which the red ores of lead and native gold are met with on the Ural. We shall find hereafter, that at Beresov, the brown iron ore, which contains the grains of gold, is only to be found where seams of quartz (enclosing the lead ore) have burst through the micaceous transition masses of the hills. Now, here, as well as at Beresov, the gold would seem to exist only in the mica where it adjoins the seams; while the lead ore, on the contrary, is confined to the middle of the quartzose ridge; for, in the present case, the micaceous formation seems, with the exception of a few plates of chlorite, to have been completely displaced

by the quartz; and accordingly, while the lead is abundant, the gold is totally absent.

Three varieties of crude iron are distinguished on the Ural, the speloi, or ripe, full of granitic dross, that will swim sometimes on water, but containing whitish crystalline solid masses, almost analogous to the fibrous hornblend, or the stahlschlacke of Bendorff, on the Rhine. The tretnishok, or middle quality, which is produced from the pure magnetic ores; and the white, nearly free from coal dross, which first runs off from the furnace, and is here called zhestokoi, brittle, properly 'churlish' iron.

The construction of the bellows, for the furnaces here, furnishes another proof of Russian contempt for the mechanical difficulties that embarras even the well provided artizans of Europe. The bellows are almost wholly of lime wood, and perfectly air tight; their form is cylindrical, and, by means of a valve opening inwards, both on the upper and lower side, a continual current of air is maintained. Though cast iron cylinders have been substituted, at great expense, by the government, in the works at Verkhnei Turinsk, the old apparatus still continues to be used simultaneously with the new.

The cupel-furnaces used here for re-smelting the crude iron, are in the shape of a barrel, having an outside case of thin iron plates, and a lining of quartz; they are loosely supported on a bed, that can be removed at one end; so that the metal is easily run off.

The making of iron plates is carried to great perfection. The rollers used are not formed by the lathe, but cast at once with the requisite smoothness and regularity, in moulds, rubbed over with graphite, which are bored at Verkhnei Turinsk.

While the plates are undergoing the operation of rolling out, particular care is taken that the edges be kept free from gaps, by paring them with large shears.

They are then placed in layers of twelve to twenty, on an ingeniously contrived moving bench, which passes them to and fro under a hammer of forty poods weight, by which both sides are alternately exposed to its action, while a man carefully brushes off the scales that are continually produced on the surface. Copper has become of much greater importance, since the Russians have adopted it as sheathing for their ships. The black iron sheets have been long applied to the manufacture of a great variety of utensils, besides being used in covering the roofs of houses, as the excellent quality of the metal enables it to assume any degree of tenuity. Plates one arshine (28 inches) in breadth, and two in length, will sometimes weigh not more than $2\frac{3}{4}$ lbs. * The parings from the edges were formerly worked up into Uklad steel, as it is called, but are now mixed with half their weight of charcoal, and converted into bar iron : this is a saving of a tenth of the iron, so that the entire loss in the production of sheet iron is only $\frac{14}{100}$ to $\frac{15}{100}$. The sheets used for covering houses usually measure two square arshines.

In the copper ores, the pure oxydes predominate greatly above the sulphurets, and are here, as well as on the southern Ural, distinguished by an intimate admixture with iron ores.

The produce of the blast-furnaces, where the copper ores are smelted with an addition of lime, clay, and copper dross, separates into two distinct metallic beds; whereof the lower deposit consists of red copper with a slight impregnation of iron, while the upper is a highly carburetted iron of a reddish grey colour, a tinge derived from a very small quantity of copper which it retains : it is called mednoi chugun, or coppery cast-iron, in the Ural. Taking 1000 parts

* This would give a thickness of about 0·057 lines.

of the chlorite employed, the product may be estimated at 6·4 parts of red copper, and 72 of coppery iron, which may yield 11·4 parts more; so that the entire amount of the copper will be about 1·8 per cent. About half this quantity is found to run off into the dross which floats upon the produce of the first smelting. The practice here, as well as in the other works, is to add this to what is smelted in the succeeding charges, or to the copper and iron, at subsequent stages of the operations which they undergo at the forges.

As the results of experiments made upon a small scale would seem to prove that iron is incapable of entering into chemical union with copper, it may be worth while to direct our attention to the phenomena presented in the smelting-houses; for it is easy to produce such a perfect separation of the two layers of molten metal already mentioned, by artificial cooling, as to show that the probability is more in favour of two different states of combination than of a mechanical mixture of them.* It is only after, perhaps, ten smeltings that it is possible to separate the iron in a state of dross, and collect the pure copper at the bottom of the furnace. To these difficulties is to be referred likewise, the additional one that, when the ores are too suddenly heated in the furnace, the greater part of the copper will frequently escape, and deposit itself in fine metallic dust at a considerable distance.

* It is not easy to determine the quantity of copper contained in the coppery cast iron, as the refuse of former smeltings is added to the succeeding. The analysis of M. Helm (at Yekatarinburg) gives—

Iron - - -	66·75 parts.
Copper - -	22·25 do.
Earthy matter - -	8·00 do.
Charcoal - - -	3·00 do.
	100·00

Upon a comparison of the processes employed for the reduction of iron and copper here, we find ourselves surprised into the conviction, that the earliest attempts of the natives must have been directed to the apparently difficult task of obtaining the copper; for were the ores heretofore, as now, brought into a perfect state of fusion, it would appear to be impossible to effect the separation of the copper, without being struck by the presence of a preponderating quantity of iron. Yet nothing but masses of pure copper were found about the smelting-works of the aborigines of the Ural — the Chudes, as they are called by the Russians. An old shaft, however, still well secured with wood-work, which was discovered near Gumeshevsk, on the western slope of the chain, and the greater purity of the copper ore formerly raised there, may throw some light upon this problem. Perhaps the same special phenomenon, of greater purity in the ore, may apply to other places also, which are known to have flourished in by-gone ages of Siberian enterprise.

Another important branch of industrial operations at Tagilsk, is the lackering of iron plates with a composition capable of resisting the action of boiling water, a process probably derived from the intercourse long maintained by the Siberians with the Chinese. Articles of every kind are so commonly manufactured of this ware, that it has become almost indispensable, in the completion of the furniture of a Russian household. The painting of this species of manufacture has been entirely left to uninstructed native artists; and some individuals of undoubted talent have appeared among them, so that the wares, made at Tagilsk, have been sent to Slatoust, 400 versts distant, to two eminent painters there, Boyarchikov and Bushuyev, and then returned to Tagilsk, to be re-

lackered. There is a factory of similar reputation at Yekatarinburg; but the superiority of the iron secures a preference for Tagilsk.

Latterly, the proprietors of the mines have turned their attention to the further development of this art; and have sent some of their workmen into Europe, to improve themselves in drawing and painting. Some have already returned from Italy, sufficiently qualified to undertake the instruction of their countrymen, in the school of arts, at Tagilsk. Well chosen national subjects render the designs of some of them peculiarly interesting. One of these is a portrait of Yermak, supposed to be taken just upon the successful termination of his great enterprise; he wears the fatal coat of golden mail, presented to him by the Tsar, on the news of his first victory, and which soon after proved the cause of his death, in the Irtuish, into which he fell, and sank under its weight. Nikiti Dimidov, the founder of the prosperity of the Ural, is a favourite subject of artistic labours. His features represent the man of enterprise and resolution; his want of hair may be owing to the cares of a long and anxious life, or to the then universal fashion of shaving the head; while the sturdy staff that he bears announces the untiring explorer of the mountain. The representation, too, of a hermit's cave, on the banks of the Irtuish, near Tobolsk, has its value, in affording a view of this remarkable city, in a state of which no traces exist at the present day. Through the hands of these artists alone, can the varied stores of information derivable from the ethnographical and natural features of Siberia, be disseminated over the west of Europe.

About a verst eastward from the factories, we come to the foot of a steep ridge of rock, 300 feet high, and

stretching about three versts to the north. This rock, which is merely one mass of iron ore, furnishes an inexhaustible supply to the furnaces of Nevyansk, as well as Tagilsk. The abrupt declivity, which bounds it on the west, is partly the result of human labour, for ever since 1720, it is here that the ores for the use of the works of the Dimidovs and Yakovlevs have been raised from a sort of simple quarry, which is sunk as far below the level of the adjacent plain as a common pump can discharge the water. A limit is, however, set to the progress of the workmen, from the western slope towards the heart of this gigantic block of ore; for as we proceed eastward, the brown ironstone, which forms the outer soft covering of the hill, passes, by imperceptible gradation, into the gritty magnetic ore, which furnishes the richest and most valuable crude iron. Now, this ore attains such a degree of hardness, where it approaches the core of the mine, as to resist the miners' tools, and even to preclude the possibility of blasting with powder, as the produce of ore is found insufficient to compensate the destruction of the boring instruments.

Judging by the direction of the seam, this mass must form a part of the system worked at Nevyansk; though it is much poorer there, where it is enclosed in micaceous rock; and much more productive when appearing contiguous to a crystalline porphyritic greenstone, as here, and in its more northerly offsets. As we remove westward, from the skirts of this colossal accumulation of ore, over the plain, we first find the surface overspread with nodes of pulverulent brown ochre; and lastly, follows a uniform-coloured micaceous bed. The wealth, lying hid far below these unpromising external features, was unsuspected till 1812. Nothing but iron ore was known then, in Tagilsk; while now, a dense population is actively employed in raising and transporting copper ore. A

scientific and well-regulated system of mining is now pursued there with success.

The ore is obtained by sinking shafts to the depth of about 200 feet, the water being conducted to a well from which it is pumped through a distinct shaft. None but women are engaged in the carriage of the ores above ground; while the working of the mine below, is left exclusively to the men. The pumps were worked at first by an overshot water-wheel of 35 feet diameter, which is now replaced by a steam-engine.

The water in the wells, at 196 feet, had a uniform temperature of 3° 90′ R. There was an evident increase of temperature in the lower strata of rock; and by comparisons made with the superior earthy strata, the increase was shown to be 1° R. for every 112 feet. The incontestable evidence afforded by mining operations, of the existence of some source of heat in the interior of the earth, has only been duly appreciated within the last few years. Localities, favourable for observations on this subject, had hitherto presented themselves only in the temperate latitudes of Europe, or else between the tropics, in America; so that the present observations were the more desirable in support of the universality of the phenomena favouring that conclusion. From another point of view also, it was agreeable to discover here, that the deeper-lying strata of rock exceed in temperature those at the surface; and that those climates which, from meteorological constitution, are more sparingly supplied with atmospheric heat than Europe in general, are yet not without subterranean sources of it.

When it was first reported by credible eye-witnesses that, at a moderate depth, the earth was found frozen all the year round in Siberia, the philosophers of Europe accused the narrators of giving way to delusion. The temperature of our planet was then thought to

be influenced by atmospheric causes alone, and where these were not sufficient to thaw in summer the outer surface of the ground; it was supposed that its interior must have a temperature equally low. To the natural repugnance that men felt at the idea that they were the inhabitants of a ball of ice, thawed only on a limited portion of its surface, came also the scientific objection, that ice had never been known to form at the bottom of the sea. The assertions of the Siberian travellers were thus met by an attempt to show the various absurd conclusions to which they led; and it cannot therefore be unimportant, if along with the proofs of the fact of perpetually frozen ground, which we shall adduce hereafter, we bring forward also some confirmation of the alleviating circumstance of an internal source of heat. Though, as will be shown hereafter, it must be admitted that the natives of Yakutsk gather their corn from strata of eternal ice, which are never thawed more than 3½ feet deep, it may, nevertheless, be satisfactory to many to learn, that these frozen beds cannot extend beyond 630 feet downwards, and that at the depth of 24,500 feet in their climate, we might expect a temperature equal to that of boiling lead, with the same certainty as at 24,000 in Europe.

The rock in these mines is of very singular quality: it is a mica, of so little coherence, that the water as it soaks through it reduces it to a soft paste, and it is only by careful lining of the galleries and shafts that they are prevented from bursting in. The only firm portions of this rock are the nodules of copper ore. Confused masses of crystals, malachite with calcareous spar, blue carbonate of copper, and copper ochre, lie scattered in the yellowish-white mica, where they are enclosed in chlorite containing copper and iron. We frequently saw the malachite distinct and pure, but not of that great size or purity in which

it occurs in the copper mines belonging to the family of Turcheninov, at Gumeshevsk, near Polevsk, on the western slope of the Ural, in latitude 56° 5′. Copper pyrites is just as rare here as iron pyrites in the magnetic iron. It is a remarkable circumstance too, that the copper ores are separated from the iron rock by a barrier of soil exceedingly poor in ores: there is also a no less striking difference in their horizontal distribution. The iron ores are collected chiefly at the surface, where they even exist in a distinct mass, their exterior layers being more oxydised than the interior, but never exceeding them in compactness.

In both points of view the copper ores present the reverse of this. There is nothing more than a few scales of solid copper, or little fragments of copper-ochre in the upper part of the seams to tell of the mineral riches lying below; nor is it till we have proceeded some way downwards that we meet with the oxydised ores amassed in extensive beds. A similar instance of the simultaneous appearance of the two metals occurs at Slatoust; while the copper mines of Miask in 54° 5′ N. lat., like those now under consideration, lie on the eastern slope of the Ural, on the line which, in that part of the chain, is noted for the richest accumulations of iron. The appearance of iron ores, however, contemporaneously with the copper of the transition formations of the Ural, must not be taken as an absolute rule; for the richest veins of malachite are found in the calcareous hills near Gumeshevsk, at a distance from the magnetic iron ores, on the western slope of the Ural, and thirty versts from the water partition.

The copper sandstone deposited subsequently to the formation of the metalliferous rock, and which we have already noticed as existing to such an extent below the plain to the westward of the Suilva, affords such a uniform and steady supply of ore, that, for a

long time, no one thought it worth while to explore the resources of the uplands. The points where these ores were originally raised, present us with the most indubitable evidence, that the thin horizontal seams of metal must have been quietly deposited in the bottom of a broad basin, simultaneously with the debris of the mountains, as well as with the stems of trees, partly charred, and partly petrified.

A closer examination of the constitution of these stratified formations indicates that the conglomerated rocky fragments, of which they consist, must have been carried down from the Ural: the bands of copper by which they are traversed are proved to have the same origin, by the veins filled with copper which have been recently opened in the central range of those mountains.

We now trace the significant analogy between the stratified formations on the west side of the Ural, and the beds of disintegrated rocky particles which contain the gold and platinum found in the vicinity. But the similarity of their geognostic composition is likewise attended by some widely distinct characteristics. The copper veins in the transition rocks — the partial destruction of which gave origin to the metallic deposit in the dispersed strata — are here found in great abundance; while intact sources of the scattered particles of gold are much more rare, and there is scarcely a trace of platinum in its original position. Notwithstanding the enormous extent of the bed of conglomerate, and the regularity of its supply of copper, it can yet hardly bear a comparison as to productiveness with the original mountain stores; while, on the contrary, the same formation yields a more abundant harvest of the noble metals than might be expected from the presumed extent of their original reservoirs.

The features, by which a two-fold submersion, the one depositing the copper ores, the other the noble

metals, is recognised, are more distinctive still. Where the sediment containing the copper was deposited, the waters must have been quietly collected into a basin 100,000 square miles in extent. The steep barrier of Alpine limestone and older stratified gypsum, which rises above the plain, shows the limit of these deposits; which, though derived from the mountain range, seems never to have rested upon its sides, nor on the rocks, of which the detritus once formed a part. But in the other case, the strata wherein the gold and platinum are found, are diffused over wide valleys and levels, immediately contiguous to the metalliferous rocks from which they have been swept, often bearing evident traces of local inundations, such as are sometimes witnessed in the present day, from the accidental damming up, and sudden discharge of, Alpine waters.

The rocky fragments of which these deposits are composed, assume forms as obviously dissimilar as the mode of their production. In the copper conglomerate they are invariably smaller and rounder than in the beds where the nobler metals exist; the slow subsidence of the triturated particles of the former favouring their aggregation into solid sandstone, while the larger fragments composing the latter, are rolled together in irregular heaps, as they might be found in the channel of a rapid stream.

There are no scientific means adopted in these copper mines for the renewal and purification of the vitiated air; the workmen are merely directed to return to the surface as soon as they observe their lights affected. These lights are small tallow candles, with an admixture of charcoal dust, which is found to increase the intensity of the light.

The miners are under the same regulations, here, as at Nevyansk; except that they have twenty-five kopeks additional per day, instead of meal.

The principal station for washing the gold, which, as well as platinum, is plentiful in some localities, is near the water-partition of the mountain, at the pass already described (p. 228.). The grains are found among blocks of porphyritic greenstone; but the white fragments of quartz, which were considered indicative of the presence of gold in the micaceous rocks, are wanting here.

The woods of the Dimidov family, so essential to the working of the furnaces, occupy an extent of 11,500 square versts, and are so thick that the woodmen can hardly swing their axes: elks are to be found in them, as the antlers frequently met with testify.

We had to-day an opportunity of making some observations on the changes which the temperature may undergo, four feet below the surface. A thermometer, sunk four feet in a stratum of clay, gave + 6·33° R. for the temperature of this day; and we had thus one of the terms, the complete series of which expresses the periodic temperature of the place. Now, Fourier has shown that, for the same depth at different places, the range of greatest variation of temperature is proportional to the extreme alternations of the air above; and we know, too, from the experiments of Ferguson, that at different depths in the same place, the conducting power of the upper strata of the ground is sufficient to establish a mutual relation between the changes of the temperature of the air and earth. This empirical attempt would, therefore, afford some insight into the local conditions of the earth's temperature, were we to take into our calculations likewise, that the change from the coldest to the warmest month, is for Tagilsk, 31° R. The mean temperature there is + 2·36° R. At the depth of four feet below the surface, the variations for the year, extend to 3·98° above and below the mean value — the ground being frozen at the depth spe-

cified, from the 16th of January to the 3d of May; while on the other hand, from the 15th of July to the 15th of November, the heat oscillates between + 4° and + 6·34° R. The climate may, consequently, be sufficiently favourable for the growth of summer and autumnal plants; though, from March to June, those only can exist which are found to thrive beyond the snow limit on the upper Alps. As for the forest trees, it has been proved, that the frost never penetrates beyond 5·6 feet into the earth; so that the extremities of their roots may shoot below the frozen soil: though recent inquiries have demonstrated, that the larch and the arve (Pinus cembra) flourish even where the ground is perpetually frozen.

245

CHAP. XI.

LAYA.—KUSHVA.—MAGNETIC MOUNTAIN OF BLAGODAT.—MINERAL RICHES ANCIENTLY KNOWN.—CHUDISH MINES.—IRON ORES OF BLAGODAT.—KACHKINSK.—DISTRIBUTION OF GOLD AND PLATINUM.—FOSSIL ELEPHANTS IN THE METALLIFEROUS DEPOSITS.—TURINSK.—MAGNETICAL PHENOMENA AT SHEITAN.—VERKHOTURIE.—FALLEN IMPORTANCE OF THE PLACE.—BESSONOVA.—NORTHERN LIMIT OF TILLAGE IN THE URAL.—GOLD AT LATINSK.—RICH PRODUCE.—BOGOSLAVSK.—MINES OF TURINSK.—CLIMATE.—THE VOGULS, ALL HUNTERS.—RETURN FROM THE NORTH.—THE BLACK SPRING.—PLATINUM BEDS.

THE following day, at four in the afternoon, we started on our progress towards the north, and passing through the village of Laya, twenty-eight versts from Tagilsk, and round which the forests are cut down and tillage introduced, we reached, at the end of another twenty versts Kushva, very agreeably situate among rocky heights.

September 8.—A line, running parallel with the general range of the Ural, would nearly unite Kushva with Nijnei Tagilsk, and Nevyansk; while the level of the valleys continues nearly at the same absolute height, from Yekaterinburg to this point—the river adjacent to the town being about 910 feet above the sea. The same geological systems exist here as at those two places; but all detached masses of rock rise to a greater height, and deeper valleys divide the several formations, as for instance, the crystalline greenstone from the iron.

The hills are covered with thick forests, principally of pine, but with this peculiarity, that different va-

rieties — Pinus sylvestris, abies, larix, cembra, and pichta, are intermingled as in an artificial park.

Through the politeness of the officers resident here, we enjoyed every facility in the inspection of the works; and the examination of the iron mines in the district seemed to demand our attention in the first place. Kushva, Turinsk, Serebryanska, and Baranska, are known as the Blagodat works, from the Blagodat *, a remarkable mountain, whence they draw their supplies of ore. As magnetic investigations formed the purpose of our journey, this far celebrated magnetic accumulation was naturally an object of interest; so, following a wide and well kept road, which is afterwards continued to Serebryanska, and the navigable river Chusovaia, we proceeded on our way to the Blagodat. After passing a gentle line of hills, which terminate rather abruptly on the left of the road, we found them, further off, running into a line of sharp pinnacles of the hardest greenstone, having much the appearance of basalt, and taking a direction N.N.W. Thin plates, and, in some instances, almond-like ganglions of feldspath, and scattered crystals of augite, are found in its mass. †

The summits of these hills are clothed with a luxuriant growth of pine, forming a striking contrast with the two rugged naked peaks of the Blagodat, which rise out of the plain a little beyond: a wooden bridge, which spans the cleft between them, and appears to hang in air, gives a further picturesque effect to its outline. The lower and western eminence is ascended by a flight of narrow steps cut in the rock, whence we pass by the bridge to an elegant stone chapel on the other hill.

* From *blagodate*, blessing or benefit, *Russ.*

† The specific gravity of the Kushva greenstone I found to vary from 2·973 to 2·933, the density of water, at a temperature of 12° R., being taken as unity.

The concealed treasures of this district must have been known to the earliest inhabitants, though the latter were unable to avail themselves of them; for the Chudish mines, as they are called, some of which are scattered as far as the Chusovaia, were looked upon by the natives, at the time of the Russian immigration, as works of unknown origin.

The legend is, that about the beginning of the 18th century, one of the Voguls, Stepan Chupnin by name, communicated the existence of an iron mountain at Kushva, to one of the proprietors of the mines further south. The result was, an immediate irruption of Russian mining adventurers, which proved so unwelcome to the Vóguls, that they burned their communicative countryman, alive, on the Blagodat; and, as an expiation of this act of cruelty, the chapel was erected on the spot.

On the S. and S.W., about 200 feet lower, we saw a line of rocks, glittering with particles of metal, and pierced in every direction by shafts. Wooden trams are laid down here, to facilitate the removal of the ore.

Neither the greenstone hills on the east, nor those which bounded the prospect in the remote west, rose much above the actual horizon of our position: not so in the direction of 25° N. 7° W., where, in the line of strike of the iron mountains, the towering peak of Kachkanar rose high above us.

The rock on which we stood was composed of flesh-coloured feldspath, and bright black magnetic iron. In rare cases the ore had settled into glandular concretions of octahedrons, about an inch in diameter; but, for the most part, the constituents of the mass were incorporated so as to have a coarse-grained granitic appearance. Besides these, a bright yellow fossil, in delicate short needles, like fibrous epidote, had collected between the crystals of feldspath. The

variety of colour in this rock, as well as the play of light upon its surface, when polished, render it peculiarly adapted for cutting; and blocks of it may be obtained of any size. This part is not used in the furnaces, but only the strata at the western foot of the hill, which consist of a purer and less contaminated ore.

The horizontal magnetic influence of the Blagodat was not to be reduced to any law. A well-poised needle, at five feet from the surface, was infinitely more affected by its mass than by that of the earth generally; yet so capriciously, that it was only necessary to move the instrument a few steps to produce directly opposite effects. Still more, when the needle was brought down to the surface, the change of position, of even a few inches, would so completely reverse its direction, that it was evident that every group of crystals had its own individual centre of attraction.

The height of this hill was about 450 feet above the plain of Kushva, and 200 above the purer masses of ore contiguous to it, on the S. and S.E. The solid magnetic ores are, in some instances, worked by powder-blasting, sometimes by wedging; but there are some seams of ore, isolated in the surrounding clay-rock, which are always found oxidised; and the little Blagodat, which contains some scattered beds of brown iron ore, is a micaceous greenstone hill immediately adjacent. Hæmatite occurs at Balakinsk, forty versts from Kushva, in the crystalline limestone.

Very powerful magnets were, at one time, procured from the quarries of Blagodat; they are now rare: and this is, perhaps, correctly ascribed by the workmen to the coarser crystalline texture of the ore; for the magnets once found here, of a cubic inch in size, and capable of raising a hundred times their weight, were always remarked to have a fine shivery fracture;

whereas, now, none are met with that could exert more than a sustaining power of forty times their weight. Good magnets are more frequent at Kachkanar; and a mine has even been opened in the adjoining establishment of N. Turinsk, for the especial purpose of procuring them. The iron ore of Kachkanar is said to contain too much sulphuret for smelting; so that these magnets may be only pieces of magnetic pyrites.

The elevation of the Kachkanar is 2760 feet above the sea.* The line connecting this hill and that of Kushva, distant about 50 versts, is exactly parallel with the line of direction of the iron lodes, further southward; the formation seeming to preserve this parallelism more uniformly than the line of the water-partition itself. The iron hills would have reached a very unexpected height in the northward, if the Kachkanar were composed of real ore; but this is stated not to be the case. Magnets are discovered on its slope, and even detached blocks of ore, at the distance of ten versts to the southward; but the principal constituent of the crags at the summit is hornblend.

On the Blagodat, the feldspath and magnetic ore overlays the pure iron ore; whereas it is the hornblend that takes the upper situation on the Kachkanar, as well as in the southern offshoots of the seams at Kushva. The blue mountain (Sinaya Gora), fourteen versts S.S.E. of the Blagodat, has a mine driven into the hornblend, of which it is almost wholly composed, and which yields a fifth of its weight of iron. It was to the southward of Sinaya Gora that copper ores were discovered, in the green-

* M. Terletskü makes the height of the Blagodat 224, that of the Kachkanar 740, French feet more than our measurement. Not having his data before me, I am unable to make any attempt to reconcile this discrepancy.

stone bounding the ferruginous rocks on the west, and which led to the opening of the rich mines at Tagilsk.

Our entertainer at Kushva was M. Volkov, to whom the world is indebted for the first specimens of platinum procured on the ancient continent.

The rich magnetic iron ores found at Kushva, have the property of losing much of their original compact texture when exposed to the air; so that they are not only much more easily broken up for smelting, but it is even maintained by many of the miners that this effect might be so far promoted by artificial means that roasting might be dispensed with.

The oxydised ores already noticed are considered as an indispensable addition to the magnetic ores for the cannon foundry, where the requisite admixture of alloy must be strictly attended to, even in the casting of balls and shells. Experiments were making at the time of our visit, as to the best composition of metals for the axles of wheel-work: the result of many experiments was in favour of an alloy of eight parts of copper with two of iron and one of tin.

September 9. — Gold and platinum in this district lie in beds of pebbles, partly at the bottom of the valleys that cross the course of the Tura, and partly diffused more widely through the plains, on either side of this river; the metals lying among the detritus of the hornblend and feldspath, collected between the transition-limestone rocks which bound the valleys. There would appear to be no difficulty, at first, as to the source of their production, as they are scattered over the slopes of the Ural, east and west; still, the unaccountable peculiarity was found to prevail here, that the quantity of gold in the undisturbed veins of quartz was much less than in the sedimentary beds, and that it was likewise different in its form and condition, being in crystalline scales in the former, and

in roundish grains in the latter. It cannot therefore proceed from veins like the present, of which the beds on the east of the hills, in the district of Kushva, are formed; but the whole substance of the rocks through which these veins penetrate, must be impregnated with the metal. It was in a bed of worn fragments of greenstone and limestone, washed by the river Iss into the lower valleys, after the bursting of a dam formed across it, not many years since, by a land-slip, that platinum sand and iron mixed with titanium was first found.

In this vicinity, as well as in many other gold-washing stations near the Blagodat, grains of cinnabar frequently remain among the metallic residue, after the water runs off. This mineral is probably contained in the calcareous schists of the lower cross valleys; but its original depository is as little to be pronounced upon as that of the metals already mentioned, which are disseminated in the debris of the higher rocks.

Those layers bear obvious traces of having been in motion down the valleys, even in recent times; but the more extensive collections of similar masses in the distant plains, are impressed with demonstrative evidence of having long occupied their present situation, by the bones of elephants belonging to an early period of the world, which lie imbedded among the metalliferous sand and stones. It seems certain that those partial floods, which washed the metallic rocks of the middle range of hills over their declivities, must have gradually declined in violence in latter days. Still, a reference to the earlier, and more destructive of them, can, by no means, account for all the phenomena connected with the diffusion of the precious metals, as we must always assume a corrosion of the greenstone and syenite, anterior to the floods.

September 10. — We departed for Nijnei (lower) Turinsk, which lies on the Tura, at twenty-one versts

below Verkhnei (upper) Turinsk, at the confluence of the Kushva and Tura.

A rock of flesh-coloured crystals of feldspath rises on the opposite side of the river: it is a rugged mass, of about 350 feet high, and has obtained the name of Shaitan, or Devil, from the Tatars. Its stratification is perpendicular; and running N., while it is divided by regular fissures, with a N. E. direction, it is thus separated into a number of rhomboidal columns. Some remarkable magnetic properties were observed in the rocks here by M. Eversmann, in 1812. We now discovered a small space, of only a few feet in extent, on its northern declivity, on which the needle of a Dolland's compass was turned completely round; and that this effect could not be ascribed to a limited portion of the rock only, was demonstrated by detached blocks exhibiting only a very slight power over the magnet; while it was still as evident as before, close to the walls of the quarry from which they were taken. Nothing beyond a very slight covering of ochre was detected on the surface of the schists. It is further remarkable, that the distribution of power seemed to be quite opposite to that at Nevyansk (p. 215.); for on the Shaitan, the north end of the needle was attracted, while at Nevyansk the dip was diminished.

From Nijnei Turinsk to Verkhoturie is seventy-six versts, through forests, luxuriant meadows, and gradually receding hills, till at length the plains are reached, and the churches and towers of the town appear.

September 11. — It was something unexpected to find, upon descending into the valley of the Tura, that the monotonous plain on which the town is built rests upon granite. It contains gadolinite, and the common juniper flourishes in the woods on the borders of the valley.

A rich and beautiful stream, issuing from the cliffs, was found to have a temperature of +2·10° R., or 2·6° lower than the spring near the top of the Brocken; but, were the general temperature even lower still than that of the German mountain, the variations of it, through the several seasons, is much more favourable to vegetation here than there. The severity of a frost, unknown to any part of Germany, is compensated by the dry and clear atmosphere of the summer and autumn, such as is never experienced on the Brocken.

Oats and barley thrive in the neighbouring plain, and agriculture has, for many years, been an object of attention to the inhabitants of Verkhoturie. The extent of the town, and the imposing appearance of its public buildings, however, present a strange contrast to the actual condition of the place; and, for the first time in the Ural, we were struck with the vestiges of by-gone importance. As early as 1605, the place was surrounded with a wall, which rendered it the bulwark against the restless Voguls; while its monastery, the oldest in Asiatic Russia, and its many churches, spoke its consequence as the capital of a flourishing district. The fertility of the soil in the neighbourhood of the present city of Irbit, had attracted a number of Russian settlers; and, as the continually increasing trade with Siberia rendered it worth the while of the government to establish a regular system of communication between Europe and Asia, Verkhoturie was chosen as the station where the transit duties were exclusively levied. The custom-house barriers still remain; but the hall, in which the passing merchants formerly deposited their lading, is now converted into a sort of market, where the resident traders conduct their limited dealings with the adjacent country. The religious features of the place are the least changed. The body of one of the ancient

burghers of Verkhoturie is still preserved in the church of the monastery which he founded, and is visited with reverence by the faithful.

September 12. — We drove over a flat, but rugged plain, on log-ways, thirty-five versts north-westwards to Bessónova, *i. e.* the Sleepless, where the Lyalya is crossed. From this point the former main road ran, westwards, to the crest of the Ural, by the pass of Pavdinsk. There are but four horses kept now at Bessónova, where every thing looks so desolate, that it is almost impossible to conceive that it was once a place of importance. But it is not at all unusual to travel fifty versts without seeing a human dwelling, even on the greatest thoroughfares, in Russia.

Barley was observed on the left bank of the river, and this is the most northerly arable land under the meridian of Yekaterinburg. The sides of the valley of the Lyalya are greenstone slate, and a thick bed of turf; but no granite appears. Pine woods recurred again, as we turned from north-west to north, near Latinsk. At this station gold-washing is carried on with success by a miner from Bogoslovsk, who was tempted here by the reward offered for such discoveries.

On the bank of the shallow stream a bed of sharp stony fragments, overlaid with a thin crust of clay, is found under the peat which covers the surface. The river, however, is only chosen for the convenience of the operation; which consists in pumping water through pipes over a slightly inclined bench, the upper end of which is overspread with small pieces of stone and clay. The softened earth is kept constantly drawn with wooden rakes towards the upper part of the form, as long as darkish veins of mineral sediment appear in the water as it runs off.

The sediment remaining on the bench is a mixture of iron sand with reniform grains of solid platinum and

gold. This instance alone would sufficiently disprove the notion, hitherto entertained, that these two metals were never found together; and that, on the Ural as well as in America, the platinum occupied the east, and the gold the west, of the mountains. The produce was about $\frac{1}{400000}$ in weight of gold, and nearly the same of platinum. *

Many stations to the northward of this point bear the name Zimoveya †, or winter residences; they were either the settlements of early Russian adventurers, or Kosak posts established for the collection of the tribute of peltry.

It was late in the evening when we arrived at the station next to Bogoslovsk, of which it now forms almost a suburb. The habitual wakefulness of the Russian boors brought them out with torches, upon hearing the noise of our carriages, to guide us in the steep descent to the Kakva; from whence a smooth and level road brought us to Bogoslovsk, the utmost goal of our journey on the Ural.

September 13—15. — This little establishment is seated on the Tura. ‡ The land is flat towards the south and west, while the view towards the west-north-west is bounded by the blue and wooded eminence known by the name of the Rock of Kanjakov; but the copper ores (of Turinsk) are found in the limestone, at the distance of three versts from Bogoslovsk.

* A richer bed has been recently worked higher up, near a morass, at the source of the Travyanka. A bed of short rubble lies immediately under the surface, and above two layers, one of yellow, and the other of brown clay. Where the clay was in contact with the coarser layers of pebbles, the yield of gold was about $\frac{1}{200000}$, while the finer gave $\frac{1}{21000}$, and even so much as $\frac{1}{1000}$ of the weight of mineral. Platinum was found at the same time, and, it is said, cinnabar also. The greenstone was here much less compact than that of Kushva, its specific gravity being only 2·674 compared with water at + 12° R.

† *Zima*, winter, *Russ.*

‡ An affluent of the Sosva, not to be confounded with the more important stream mentioned above (p. 252.), which joins the Tobol.

At the entrance of this mine, the metal shows itself in inconsiderable quantity, but lower down it forms the principal constituent of the rock. It would seem that the pure metal had been suddenly driven into the then existing formation, for plates of solid copper, of a line in thickness, are imbedded in the fissures of the stratum. The surface of these plates is not, however, smooth, but invariably crystalline; as if it was merely the chemical resistance of the rock that produced the flattened form. The more compact mass of the contiguous limestone is interspersed with delicate flocculent crystals of the pure metal *, while the oxydes are intimately incorporated with its substance.

The water which collects in the well of the shaft, at 365 feet from the surface, had a temperature of 4·97° R., when that of the air could not have been 2° R. (page 253.).

In the Fraulov mine, on the west, the condition of things was altogether different. There the shaft cuts the strata, which dip suddenly westward, at right angles, and bright small calcareous crystals glitter through the lining of the descent; while the walls of the Turinsk galleries are dark and earthy, and nodules and streaks of pyrites announce the approach to the metal, which is at last reached at 180 feet. Compact quartz and pyrites have here penetrated into the calcareous mass; cubes of iron pyrites come first, then the limestone disappears, and copper pyrites, galena, vitreous copper, and blend, take their place in the pure quartz.

The bed of ore is covered with a layer of rock, seventy feet thick, which, in any other vicinity, would be looked upon as an unusual phenomenon: it is a

* Like the spritzkupfer (German), which is projected, in a sort of vapour, from melting copper.

cinnamon-brown, glassy, variety of granite, which is known among the Russians by the name of venisa. This formation divides the cupreous limestone of Bogoslovsk from a tract of low rugged ground, on the west, which terminates at the rock of Kanjakov.* Portions of this rock, which I obtained, showed it to consist of crystals of hornblend, an inch long, and solid white feldspath. The remarkably clear and regular separation of the two constituents of this formation, as well as the rare appearance of pure granite, might seem to justify the assertion of the earlier geologists of Norway, that all the rocks of the north afford evidence of quiet and undisturbed deposition. Nothing, however, but wilful inattention to geographical precision, could have cloaked the fallacy of this rash dictum, which might refer, with equal plausibility, to the colossal iron masses of the Ural, in support of such a theory.

It is incontestable, at the same time, that, though the crystallised formations, to the west of Bogoslovsk, militate against the idea of a Neptunian origin, the now nearly perpendicular strata of limestone, found in its vicinity, must have been formed at the bottom of the sea; for the declivities of the hills, near the Tura, are studded with encrinites and madrepores.† But the jagged fragments of hornblend porphyry, which are found among the remains of marine animals, are more interesting still; just as we find black basalt, enclosed in the limestone, with which the coral insects have covered the Volcanic formations of the South Sea.

* The specific gravity of this rock is 3·29—3·30; the hornblend in it is 3·375, water, at a temperature of 12° Reaum., being taken as unity.

† The spirals of the encrinites are filled with yellow and flesh-coloured calcareous spar; but the sipho, with compact grey limestone. The calcareous matter in the madrepores is never crystalline.

Upon an examination of the water collected in a hollow of the limestone, in the Fraulov mine, 210 feet under ground, and at a distance from the metallic veins, its temperature was +3·12° R., or 1·85° less than that taken in a gallery of the Turinsk mine, 144 feet lower. A comparison of these two results, gives +0·9° R. for the mean temperature 20 feet below the surface, at Bogoslovsk.

The earth is frozen longer and deeper here than at Tagilsk (page 243.); and here too, is observed the same dry condition of the upper strata in the winter, without any diminution of the water lower down. The water pumped from the Archangel shaft at Fraulov, on an average of four years, was as 102 in January, February, and March, to 100 in June, July, and August.

The mines of Bogoslovsk, Nikolai, Pavdinsk, and Petropavlovsk, are, at present, the property of the Bank of Russia; and, under the management of intelligent administrators, have become a centre of mineralogical investigation. The workmen are, for the most part, banished criminals, or vagabonds, whose restless activity may one day, perhaps, have a beneficial effect also upon the agricultural condition of the country, if they should become reclaimed and settled, as in other parts of Siberia. It is said to be impossible to produce bread-corn at Bogoslovsk, and that even the colewort and turnip (Brassica campestris, and B. napus) will not thrive there, though found near every other Russian settlement on the continent of northern Asia; for the low degree of summer heat places this district in disadvantageous contrast with other places whose mean temperature is far lower, as is evinced by the productiveness of Beresov on the Obi, and Yakutsk, where the cold is greater.

It may be a question, whether the elevation of the

place*, or the contiguity of the hills in the west, may not contribute to diminish the summer heat without materially changing that of winter; but it seems more just to explain the comparative climate of this place from the general observation, that, with a given mean height of the thermometer, the heat of summer will undergo a constant increase from Europe to the meridian of Yakutsk. Plants, which require a certain warmth of summer, thrive better here (in Bogoslovsk) than at the same degree of mean temperature in Europe; though still much less favoured than in eastern Siberia, where the whole yearly amount of atmospheric warmth, as indicated by the temperature of the ground, is equal.

The spiræa, and a few fruit-bearing shrubs, are found under some larches and pines (P. cembra), in an enclosure near the lake, where some annual stock and a few autumnal flowers grow likewise in beds.

A spot was pointed out to us in the forest where ice was said to exist under the surface of the ground the entire summer. We accordingly proceeded to make an excavation through a bed of ledum palustre, and various species of vaccinia, and came, first, to a layer of peat, two and a half feet thick, enclosing a few pieces of greenstone, and retaining fluid water. We next had yellow clay, and this, at a few inches down, was traversed by thin plates of ice, which brought the thermometer on touching it to the freezing point. We then went three feet deeper with a like result; and at ten feet under the surface, in an adjacent pit, the ice was still present, though at a depth of ten more it disappeared, and water from the bottom of the hole showed +1°·0 R. In the course of our researches in other localities, we nowhere found the thermometer lower than 4°·0 R. These local accumulations of ice

* 960 feet above the sea.

stand in the same relation to the frozen regions of eastern Siberia, that a patch of snow in a mountain fissure does to the eternal covering on its summit.

We had now advanced into the immediate neighbourhood of the Voguls, who, for the last hundred years, have been obliged to withdraw northwards before the encroachments of the Russians. We found it useless, nevertheless, to attempt to gain a personal knowledge of the circumstances of these aborigines of Siberia. It is only in winter, when the broken country is frozen over, that it is possible to penetrate to their settlements. We were obliged to rest satisfied with a single specimen encountered at Bogoslovsk.

It was easy to recognise this man as an individual of another race, though wearing the ordinary dress of a Russian. The expression of his eyes was peculiarly scowling; they were deeply set, and the prominent conformation of the cheek-bone was as striking a characteristic of his countenance as it is in the Mongols; he was of middle stature, with a well-knit frame, and his determined and almost haughty bearing, unlike that of the Cheremisses, and Chuvashes, reminded us of the deportment of the Votyaks. Our questions as to the manners and mode of life of his countrymen, were either sullenly evaded, or unsatisfactorily replied to, in very imperfect Russian. He seemed anxious to impress us with the belief, that the religious notions of their ancestors were rejected by the present generation, as if he feared that some designs of their conversion were entertained.

The Voguls frequently change their habitations; this they do merely for the sake of sparing the game, and at much longer intervals than several other tribes in eastern Siberia. They never allow more than five huts — Yurti, as they are called, in Tatarian, to be erected in one encampment; which must also be at the distance of fifteen versts from any other, as the

smoke of their dwellings disturbs the game: in fact, every thing relating to their arrangements in their settlements coincides with the customs of the Ostyaks. The reindeer supplies all their domestic wants and travelling requirements. The winter is almost exclusively the season of activity among them. It is then that they hunt, and carry on their traffic in peltry with the Samoyedes, Ostyaks, and Russians. The winter excursions of various tribes through the region lying to the northward of Bogoslovsk are of extraordinary extent. The Samoyedes of Europe pass the Ural, and with the cognate branches of their family, on the Kari and Obi, as well as the Voguls on the south, often extend their journeys to Obdorsk, where they exchange the produce of the chase for bread. As soon as winter is passed, the Voguls relapse into a state of dormant indolence, scarcely ever leaving their smoky huts for fear of the gnats. Before the introduction of Greek-christian scruples they used the flesh of all sorts of animals for food. If the accounts of Russian missionaries are to be believed, they now confine themselves to the flesh of the reindeer and elk, of which they lay up a store for summer also. Besides Russian cloths, the nettle, which they gather in September, furnishes the materials of their summer clothing.

Our Vogul acquaintance supplied us with the following specimens of his language, which are sufficient to prove the relationship of this tongue to that of the Ostyaks of the Obi, and the possibility of their being able to understand each other; for, of the twenty-two words learned, there are twelve, evidently but dialectic variations of the Ostyak, which are marked in the list with an O. On the other hand, there is not one of the number traceable to a Tatarian root; whereas there are four (marked with a K)

which betray more than an accidental analogy with the Kamchadale.

	Vogul.	
Hand.	Kat.	K.
Foot.	Vell.	
Head.	Pank.	K.
Nose.	Nyoln.	O.
Eyes.	Sham.	O.
Beard.	Toshun.	O.
Hair.	Æti.	
Drinking.	Utai.	O?
Bread.	Nyün.	O.
Water.	Ut.	
Fire.	Tat.	O.
Warm.	Uit.	
Earth.	Ma.	O.
Horse.	Lvu.	O.
Bear.	Opo.	
Reindeer.	Kunna.	O, K.
Ox.	Oshka.	
Horn.	Ongt.	O.
Woman.	Yekoa.	O, K.
God.	Tōr.	O.
Death.	Kol.	O.
Devil.	Tospod.*	
Forehead.	Voll.	These words were not compared with Ostyak.
Give drink.	Utmai.	
I will eat.	Tikhvatl.	
Fox.	Opsha.	

The glaring contrast between the patriarchal, simple habits of the aborigines and those of the Russian settler, was fully exhibited at a ball given in Bogoslovsk; where, not only the dances, but the music, was in perfect accordance with the refined fashions of Europe.

The Russian housewives have contrived to extract from the wild fruits with which stepdame Nature has supplied them, some excellent substitutes for wine.

* The Ostyaks call death, Kuin; the devil, Kull. Can the Vogul Tospod be formed from the Russian Gospod, Lord, or God? that the God of the strangers should be the devil of the Voguls?

That in highest estimation here, is prepared from the berries of the Rubus arcticus (in Russian, Knyazhenika, or prince-berry, first discovered in this district), the flavour of which is far superior to that of the strawberry, and scarcely inferior to that of the pine-apple. Unless it be this fruit, in its unripe state, that Scandinavian travellers* say is like the dew-berry (Rubus cæsius), this would afford one of the most striking instances of the effect of climate on the qualities of vegetable productions. The cranberry (Vaccinium oxycoccus), bilberry (V. vitis idæa), and cloud-berry (Rubus chamæmorus), also furnish each a sort of wine.

September 16.—The aspect of the landscape was already much altered from what it was only two days before; for, upon our return to Verkhoturie, the birch-trees already showed their yellow tops among the woods, and clouds of leaves were rolling before the wind. This change was hardly earlier than it might have been in Europe at the 60th degree of latitude: it would not have been more than twenty days later at Berlin. A sudden increase of the summer heat seems to be most favourable to this peculiarly Russian tree, for, in Kamchatka, where the climate is more European, it loses its leaves much earlier. Though we had seen the barley cutting yesterday at Bessonova, the peasants of Latinsk had their stoves heated to-day to 20° R., in consequence of the coldness of the morning air. After a few hours' stay at Verkhoturie we left it, in the chill of the night, and arrived (September 17) at Nijnei Turinsk, where the mid-day heat might well have dissipated all anxiety for the harvest; but the yellow birchen leaves accompanied us as far south as Kushva, where the thermometer at night stood at 1° R.

* C. F. Lessing, Reise durch Norwegen nach den Lofloden. Berlin, 1831, 8vo.

September 18. — We were welcomed, at Kushva, like old friends; nor was it till late at night that we were allowed to leave an entertainment, to which some of the guests had come even from Perm, 250 versts, over the mountains. We were here gratified with an instance of the native, unaffected hilarity of the Russians. A youthful pair, in the ordinary attire of peasants, came timidly forward to exhibit a national dance, which was gracefully and duly concluded, before the company recognised the daughter of their host, in the female performer.

We were obliged to take an unwilling leave of Kushva, in order to arrive at Tagilsk, early on the following day. The thermometer had sunk again to 1·5° R.; but the usual expedient of substituting couches for the common seats of the carriage, enabled us to sleep through our journey.

September 19. — We found our companions, who had left us behind at Kushva, ready to set out upon a visit to Chernoistochinsk*, and the neighbouring platinum beds. After passing twenty-three versts, through thick forests, we came in sight of the mines, on the border of a large piece of water, collected at the foot of a rugged rock of decomposed greenstone. About halfway from Tagilsk, a limestone quarry has been opened, in which a thick seam of dolomite is seen crossing it to N.N.E., and dipping at an angle of 45° towards the E.; on the W., below this, follows feldspath, intermixed with quartz and mica; and, lastly, true granite, containing green feldspath, which evidently rests upon greenstone.

The pond of the mines was covered with wild ducks, which find open water here, in the midst of winter; not altogether on account of the waves, which keep the ice broken, as the miners assert, but rather,

* From *chernoi*, black; and *istochnik*, a spring, *Russ.*

because of the numerous springs by which this small lake is fed.

The bar iron of this district is so noted for its superior quality, that it sells, upon an average, at three-quarters of a rooble the pood higher than other Ural iron. It is stamped with the figure of a sable, the ancient arms of Siberia, and is distinguished, even in England, by the name of "old sable iron." Sixteen furnaces, each of which produces from 360 to 400 poods of bar iron weekly, are distributed in two long buildings. Upon a layer of charcoal, twenty-five poods of crude iron are laid, in thin short pieces, which are again covered up with more charcoal; on which other bars are generally heated, at the same time, for forging. The charcoal consumed amounts to three times the quantity of crude iron, which yields two-thirds of its weight of bar iron.

It was interesting to compare the metalliferous deposits of iron particles formed on the lower end of the chimnies here, with the magnetic iron of the Ural. The form and size of the granulations were so similar as to deceive the eye; but the comparative lightness of the factitious production was sufficient to distinguish it from the natural.

Piles of wood for charcoal were the only strange objects in the forest through which we drove, twelve versts W.N.W. to the platinum beds of Chernoistochinsk. The ground on both sides of the road was hilly, but we had scarcely ascended above the level of the little lake, already noticed, which is itself only removed from the level of N. Tagilsk by the inconsiderable fall of the Cherna, when we came upon the banks of a tributary to the Chusovaia, which ran southward at this point. There was nothing but the course of the rivers to give us any idea of the direction of the slope; by the eye it was quite impossible to determine that it declined to the westward.

After having examined the enormous tables of green-stone slate, overlaid by micaceous rock, which stand nearly vertical, though obviously leaning to the east on both sides of the river, and seen that the platinum was collected from the detritus of the rocks, which are topped with granite, in the usual reniform grains, we returned in the evening.

From September 20th to the 22nd I was detained in Tagilsk by the loss of some manuscript numerical notes. In the mean time, the aspect of the country was every day growing more dreary; and the road, by which I made my way to Kushva, had been spoiled by the rain.

It was only now that the party of immigrant serfs, whom we had left behind at Perm, reached Tagilsk; and preparations were actively making in the town for the winter quarters of the strangers.

Our return to Yekaterinburg was rendered tedious and painful by the flooding of the broken ground, so that the friendly shelter of the castle of Nevyansk was doubly acceptable, while we had some repairs done to our carriage.

The willows, on the wet low grounds that bordered the road to Yekaterinburg, had only just put forth their blossoms, to perish again, in the approaching snows.

CHAP. XII.

RETURN TO YEKATERINBURG. — SHARTASH. — PLAIN OF THE PUISHMA. — INTERIOR OF THE GOLD MINE. — MINING-FIELD OF BERESOV. — GOLD WASHING. — TOTAL PRODUCE. — WINTER LIFE. — MAIDS' MEETINGS. — FOUNDATION OF A NUNNERY. — VENERATION FOR IDIOTS. — QUARRIES OF THE ISET. — GRAVING-LATHES. — STONE-WORKS. — JASPER. — TOTAL PRODUCE OF THE URAL. — IRON WROUGHT. — COPPER. — VALUE OF THE GOLD AND PLATINUM. — RIVER NAVIGATION. — FREIGHT. — RAPID DESCENT. — DETAILS OF THE VOYAGE DOWN. — BASHKIR PLAINS. — LAISHEF. — LENGTH OF THE NAVIGATION.

FROM *September* 22 to 25. — After a short stay at Yekaterinburg, we were anxious to spend the time that still remained at our disposal in a visit to the gold mines of Beresov, fifteen versts N.E. from that town.

The pine (P. sylvestris) constituted the principal part of the woods through which we passed, and the rising of the ground was almost imperceptible till we reached the rich village of Shartash, seven versts off, lying on the borders of a long clear lake, which is surrounded by a low ridge of granitic rocks. The inhabitants were once notorious for their robberies, which they committed on travellers with so much address, that none of the culprits were ever detected; and it was not till the whole community was declared responsible for the crimes of any of its members that their depredations were completely suppressed. They now devote themselves to the cultivation of the land with great success. They are, like most of their neighbours, members of the ancient church.

Upon leaving the woods, we first observed an in-

finity of conical heaps of mining rubbish, overspreading the entire of the open plains. This, at first sight, would seem to indicate that the operations were confined here to a horizontal metallic bed, immediately under the surface, like the copper schists at Mannsfeld, on the Hartz, or the copper sand on the west of the Ural; such, however, is not the case. This state of things was only owing to the difficulties encountered in draining the mines, and which had been but lately overcome. The ore is pretty equally distributed, it seems, as low as ever the shafts penetrate.

The Puishma washes the northern limit of a level district, gently inclining to the N., on which mine after mine appears. A sorry brook, fed by marshy pools fringed with henbane (Kamuish), traversed this plain from S. to N.; but its stream has been lately increased by the formation of a canal, which has made it an outlet for the water of the lakes of Shartash; the greater of which is near the town, and the less to the southward. Large quantities of peat are dug at some spots on this level, which is eight versts in length, having the head-quarters of the miners on the borders of an artificial tank, in the middle. The old wooden houses, raised about eighty years ago by a colony from Klausthal, on the Hartz, are still in existence.

A little to the south-west of the hamlet we entered the shaft of a mine, 105 feet deep; but struck into a gallery, about half-way down, in which the people were at work. The surrounding formation was soft white decomposing gneiss, studded with coarse grains of quartz, and quantities of silvery talc. Brown spots of crumbling iron pyrites are strewed through it; but the large crystals of brown ironstone are only met with where the quartz is deposited in narrow and tortuous streaks and veins. It is from both sides of the hard white lines that the cubic iron-

ore is collected containing the gold, partly dispersed in fine plates, and partly accumulated in long filaments, like wire. The ore has to be followed, in every direction, till it runs itself out in the rock; for there is no uniformity in the range of the veins.

The decomposing white gneiss has received the name of Beresite, in honour of the place. As we turned to the west of the mine, we observed this rock terminate, suddenly, against green-stone slate. Such interruptions are frequent in the vicinity; and we saw detached portions of these two rocks, which are so very different in character, intersect each other in every direction. There are only two of the larger seams of Beresite, within this immediate circuit, which take a constant northerly course.

The formations on the east and west afford some clue to the explanation of this remarkable phenomenon. To the N. E., beds of slate, resembling serpentine, having a northern range and a rapid dip to the west, appear without the gneiss; and then, downwards towards the Puishma, follows pure granite, showing coarse crystals of schorl and tourmalin, running in a sort of veins. South-westward, on the Shartash, the slate is covered by the granite; which is again displaced, in its turn, by chlorite slate at Yekaterinburg. Similar alternations of micaceous schist and crystalline granite were frequent after leaving the pass of Reshötui (p. 197.), and exist even at Makarova, on the west of the water partition of the Ural. Ores are always most productive where both formations thoroughly penetrate each other. A bold seam of quartz, rich in copper ore, and the more rare chromate of lead, intersects the middle of the mining field of Beresov. This seam makes a fair passage through the slate; but loses itself in broken filaments and particles wherever it strikes the Beresite. The lead ore has never been found, in con-

junction with the iron and gold, in the adjoining rock, only in the solid seams dividing the slate.*

The water rushes through the gneiss into the mines, in such quantity that it long prevented steady working, till better machinery and a steam-engine were employed. It may, perhaps, be regarded as at once the cause and effect of the constant and rapid decomposition of the beresite, as well as of the iron ores.

From Beresov it is six versts to the gold-washing station at Puishminsk. There is another on the brook Alexandrov to the southward.

Rocks of micaceous slate and serpentine, with an abrupt western dip, rise on the right bank of the Puishma. The ore collected is poured into long troughs where water is added, and it is beaten with cast-iron stampers. The current of water which continually flows on it through pipes, carries off the fine powder over the washing-benches, which are laid, like slightly inclined terraces, under the troughs; while many of the heavier grains of gold fall into the interstices of the double iron bottom of the stamping-trough, and are collected from time to time. As is usual with poor sand, it is often raked upwards on the benches with a wooden rake. Ores which, as here, yield only about $\frac{1}{64000}$ of their weight of metal, give not more than $\frac{1}{1000000}$ to the first straining. The richest part of the product which rests upon the upper benches is well washed again in larger receptacles, as the weight prevents its being carried off; but the poorer and finer part is again exposed to the atmosphere, and a second time washed on little tables, to which the water is led through pipes that can be directed upon any point. The iron, some of

* The only silver ores known on the Ural are found at Blagodat, twenty versts to the N.N.E., where a quartz seam runs into green slate: it is accompanied by lead spath also.

which is from the wear of the stampers, is removed from the fine deposit by a magnet. Though the separation of the last portion of the gold has been attempted by amalgamation, experience has proved that careful washing is quite as effectual.

Special arrangements are made for continuing this operation through the winter: the windows are carefully caulked; stoves, heated by horizontal shafts running below them, are prepared for thawing the frozen mud and sand, and the materials passed in to the apartment through a narrow trap in the wall, as the opening of a door would sometimes lower the temperature to the freezing point in a few minutes.

The gold obtained annually at Beresov, in a mixed state, is about 23 poods on an average; and this, at Yekaterinburg, furnishes 20 poods of pure gold, 2 of silver, and 1 of lead and copper. The entire value is estimated at 1,200,000 roobles; after deduction of the expense of working it may be 854,400 roobles.

The produce of the beds, discovered since 1823, is, however, found to exceed this by far. During the last year the gold amounted to 262, and the platinum to 50 poods; which, allowing $\frac{2}{10}$ for outlay, may be valued at 15,000,000 roubles.

As we returned to Yekaterinburg in the evening, we saw several flocks of wild geese on the Shartash, preparing for their winter flight; and some had already passed us, all going S.W. Winter life had now begun, too, with the human denizens of the place; for the Posedienki*, or evening meetings of the young women of the poorer ranks, had already been established at Beresov, and the surrounding villages. As soon as the darkness interrupts out-door labour, the men come and enjoy themselves in the warm houses. They mount up to their sleeping-places (palata) on the broad top of the stove, and

* From *posidete*, to sit, *Russ.*

scarcely leave it during the evening, till they are obliged to attend to their cattle, a little before midnight. For the sake of economising light, the young girls meet, in the mean time, at the house of some of the wealthier boors, partly to work, and partly to amuse themselves with their friends. Their occupation, and the songs and tales with which it is accompanied, remind one of the primitive German spinning-rooms. In one of their popular songs, the maidens are made to complain of the bad light given by their pine torch (Luchinka), and accuse their host of having wetted it to get rid of his visitors; when one of their companions confesses it was a stratagem of hers, to get an excuse for stealing off to her lover.

The term for an evening party of pleasure is Vecherinka (a soirée), from vecherete*, analogous to the Greek ἑσπεράω: and such social assemblies are constant when the cold has fully set in. Masking and fortune-telling† are frequently resorted to in their amusements.

September 26 to 30. — During the celebration of the festival of the lifting up of the Cross (Krestovozdvizhenie), we visited the Convent of the Mother of God (Bozhematerskyi Monastuir), on the south of the city. A political significance was added to this solemnity, by the offering up of thanksgivings, during the ritual, for the confederation entered into by Russia, Prussia, and Austria, in 1815.

We were given some of their consecrated bread (antidoron), which is baked in the form of a cross,

* *Vechor*, evening, *Russ.*

† Gadanyi, from the Russian *gadayu*, I divine; identical with the Greek γοάω, which Hesychius gives as a dialectic variety of γόω, in the sense of μαντεύω. The resemblance existing between the Sclavonian and Æolic Greek has been developed by C. Œconomides, an Æolian, who published an essay on that subject in St. Petersburg, in 1828.

but not that used at the Communion, which they receive in both kinds. The nuns formed a long train, and wore the black woollen habit; which has procured for the members of religious orders in Russia, the names of chernetz (monk), and chernitza (nun), from chernui, black. Several of the nuns occupy one large cell in common. They employ themselves at all sorts of work proper to their sex, particularly in embroidering the gowns (ruisi) worn by the secular clergy. Nunneries are much less numerous in this country than monasteries, owing to the obligation which the secular priesthood are under upon the death of their wives, either to retire from office altogether, or to enter some monastic order; so that the number of monks at present in the entire empire is about 6000, while the nuns are not more than 1000. The nunnery in this town was founded about thirty years ago by the pious exertions of the wife of a common soldier: she travelled over the greatest part of Russia, on foot, to solicit contributions; in which she succeeded so well as to be able to build, not only a church and magnificent convent, but even to enrich the establishment with relics at great expense. She assumed the name of Taisia, and became the abbess, in which station her hospitality gained her the applause and veneration of her countrymen. Her successor seems determined to fill her place with equal credit; she gave invitations to a splendid breakfast, this day, in the parlour of the convent. It is their custom to receive orphan children as noviciates as early as their third year, which may have given some grounds for the objection made to these orders, that they are more influenced by a desire to maintain the numbers of the society than by their religious vows.

The superstitious feelings of the Russians are strikingly evinced in the veneration with which the Blazhennie (from *blago*, favour, blessing, *Russ.*), or

blessed people, as they term them, are treated. They are nothing better than idiots to whom they apply this name, whose mental condition is believed to be a peculiar endowment, and indicative of supernatural possession or divine transport; and communities here consider themselves as much favoured by the presence of a blazhennie as the Swiss do with the Cretins. All their casual expressions are looked upon as oracular; and they are often invited to great distances by those who have the means to pay for their unconscious vaticinations. Religious establishments are the foremost in their anxiety to attach them to their body, by which they derive considerable profit. It is not very long since there was an instance of a female convict obtaining a remission of her sentence in consequence of some expressions of fatuous half-meaning that escaped her; and she was upon the point of entering upon a new career as a prophetess, but for the jealousy of some priests by whom she was convicted of premeditation: she was ultimately condemned to complete the full term of her exile.

The next interesting proof that we discovered of the industrial activity and resources of the Ural, was in the quarries on the banks of the Iset, which are worked by the government. The stupendous columns, capitals, and vases, which are produced here from the hardest materials, may be justly said to surpass any similar works of ancient art in point of execution. All sorts of figures in relief, curvilinear ornaments and foliage are carved with as much ease, by gravers revolving on axes, as simple cylindrical surfaces have been turned heretofore. The mechanism of the lathe has been so ingeniously and effectively applied to the operations of the graver, that the cutting disk, in which it terminates, is rendered instantaneously available for every form of arrangement of ornamental carved work. While the axis of the cutting tool re-

mains fixed in the ordinary lathe, the workman here is provided with a sort of box-rest, opening and shutting by a hinge, which enables him to adjust his graver to any distance, or in any direction he may require.

The usual construction of an endless belt, connecting the wheel and the extremity of the axis bearing the graving-tool, is preserved. But a difficulty arose in this case, from the changes in the position of the revolving axis, which was left for Russian ingenuity to overcome; the belt should have the property of accommodating itself to the variations in the distance between the wheel of the lathe and the tool directed by the workman. The contrivance adopted for this end may be readily understood from a brief description. Three sheaves, round each of which the belt makes two turns, revolve each upon an axis, fixed in the usual way in vertical boards, which, at the same time, contain the fulcrum of a bent lever. A fourth sheave, on one end of this lever, is kept steadily pressed by a weight on its opposite end, against the belt, which makes only a single turn on it, and embraces it, within certain limits, in whatever direction the hand of the workman may be held. The course of the belt from the water-wheel by which it is moved to the graving-tool requires no further notice. There are other instances, also, of clever mechanical adaptation in the adjustments of the several parts of the machinery: to prevent the wearing of the belt against the rest when worked obliquely upon the axis of the cutting-tool, each edge of the opening of the box is protected by a number of closely fitting copper-sheaves, while the axis is also provided with a similar arrangement, so that when the belt leaves one sheave it may catch upon another. The rapidity of the rotation of the lathe is controlled by the size of the sheaves. The two parts of the rest-box are held to-

gether by a ring placed upon a conical projection on its fore-side.

A number of these lathes, fixed in different parts of an extensive building, are set in motion at once, by a water-wheel driven by the Iset. The metal disks, used in dividing the blocks of stone, in the first instance, derive their motion from the same power; as do also the several pieces, at times when the operations of cutting and polishing their surfaces require it. Copper, and even leaden disks, are indispensable, in working the hardest stones, and it is only for economy that iron is used at all; for the softer the metal, the more rapid is the action of the emery powder with which it is covered. By this application of machinery to the instruments used in cutting and polishing, not only is there a very considerable economisation of time effected, but even the saving in the expenses of labour amounts to 8000 roobles yearly; while some operations, which were before impossible, are now easily performed. The size of the objects to be produced was formerly limited by the natural strength of the artist; whereas, works of colossal dimensions, which it was heretofore only possible to accomplish by piecemeal, are at present completed in a monolith.

The beautiful varieties of siliceous rocks, which are chiefly used for the purposes of colossal sculpture, are familiarly known by the name of tzvetnie kameni *, or coloured stones. We noticed many variegated specimens of jasper, agate, jasper-breccia, and hard porphyry. These quartzose rocks are met with to a great extent, only in those districts of the southern Ural which lie within the government of Orenburg, where they are found to increase in mass, till they assume almost the appearance of independent hills, as

* *Tzvet*, flower, colour,; and *kamen*, stone. *Russ.*

we recede from that mountain range into the land of the Kirgis. They come first into view where the mountain system of the Altai begins to intersect, at right angles, the stratification of the Ural, which shows such a constant range to N.N.W. As low as lat. 54°·5, or 54°·7, a green and red spotted jasper breaks out in the mountains of the Ilmen, where they run along the right bank of the Mias. This rock has, even here, a decided divergence to the east; which continues by the fortress of Orsk (where it exists in immense masses), at 51°·5, till the range of the Mamuish Tau, in the country of the Kirgis, is found taking a due eastwardly course.

The scientific mining investigations of M. Shangin have thrown great light upon these rich and beautiful formations, which extend, in a uniform course, along the Tersekan and Nura, two tributaries of the Ishim, in the latitude of Orsk, 700 versts east of this point.*

Mines opened there furnish a complete verification of the relationship of their contents to the jasper formation, in the Altai chain, in the same latitude, near the mouth of the Korgon, where the quarries of the Revnyukha (rhubarb mountain), and those between the Tigeretsk and Bieloretsk, supply some of the stones manufactured at Yekaterinburg. These elegant mountain masses are the characteristic products of that geological epoch, which saw the rise of the alps of Koluivan, Tigeretsk, and Bieloretsk, and which, by the eastern direction of their rocky strata, are so palpably distinguished from the Uralian system of elevated rocks.

In the level land of the Kirgis, these jasper hills rise through a clayey soil, rich in saline productions, and overspread with siliceous rubble, where it has evidently been lately under water. A similar consti-

* Sibirskyi Vestnik, 1820, No. 2, *et seq.*

tution prevails on the eastern border of the Ural, between Miask and Troitsk, and other parts of the government of Orenburg; which presents several characteristics, besides, of transition from the formations of the Ural to those of the Altai. The plains of this district have all the appearance of having once been the bed of a wide collection of waters. A depression of the level of several of the existing lakes is also suspected to be continually taking place; but it can be fully demonstrated, in the instance of one situate near Turdoyak, between Slatoust and Miask, which was once capable of driving a mill. Between the years 1795 and 1812, it has been proved, by observation, to have sunk 291 feet.*

The precious stones, already noticed as found on the Ural (p. 205.), are also worked up in the imperial establishment at Yekaterinburg, where there is an interesting collection of specimens, including amethysts, topases, emeralds, and red tourmalines of rare beauty. Zircons of extraordinary size have been found within the last few years near Miask; and, reasoning from the analogy between the rock in which they are enclosed, with the more northern depositories of precious stones, there can be little doubt of their extension over a much wider district. It is the granite formation, so constant in the lowlands eastward of the Ural, that is remarkable for these valuable contents. The most productive mines of the more precious fossils, are always found to exist where the general constituents

* However we may feel convinced of the relationship existing in respect to origin between the basins of the Southern Ural, the Kirgis Steppe, the Caspian, and Lake of Aral, the fact must not be lost sight of, that the depression of the Caspian is not uniformly progressive, but is proved to be merely accidental and periodic.—*Ueber die Veränderungen welche die Oberfläche des Caspischen Meeres erlitten hat*, Von E. Lenz. Abhandlungen der Petersburger Akademie. (On the Changes which have taken place in the Level of the Caspian Sea. By E. Lenz. Transactions of the Academy of St. Petersburg, 1831.)

of the granitic veins are separately deposited, in masses of colossal size. This is found to prevail at Miask, as well as more particularly at Mursinsk, 110 versts from Yekaterinburg, on the road to Alapayevsk. At these points, the feldspath is soft, and friable, and affords, not only topases and emeralds, but perfect columnar, acuminated crystals of quartz, of the enormous weight of thirty-five poods. These gigantic fragments are generally of a smoky hue; but may, nevertheless, prove valuable for some optical purposes.

Two other productions of the southern Ural, hitherto neglected, have been recently brought to notice by M. Helm, an accomplished chemist at Yekaterinburg; namely, chromide of iron, now applied to the preparation of chromate of lead, for dyeing; and liquorice (Glycyrrhiza echinata?) which is reduced to an extract, at the same laboratory. The chromide of iron is found at Polikovsk, near Slatoust, at the line of division where the clay slate is penetrated by a wedge-like mass of serpentine. This line furnishes copper ore, on the west, where it shows an eastwardly dip; while chromide of iron exists in an enormous accumulation on the eastern demarcation, where its dip inclines to the west. The pounded ore is fluxed in iron pans, with the addition of saltpetre, and the chromate of potash, obtained by elutriation, is subsequently decomposed with nitrate of lead. But so far are the people here removed from all external aid and collateral resources, that the nitric acid has first to be extracted from the saltpetre, to form the salt of lead. The workmen display an inconceivable dexterity of manipulation in hastening the precipitation of the coloured salt, which exhibits every gradation of hue, from bright sulphur yellow to deep red.

The manifold variety of the products of this important portion of the empire will give peculiar

interest to the following calculation of the quantities of the most considerable among them. In point of mass, as well as of financial importance, the iron of the Ural stands first on the list of metals: of this, the enormous amount of 7,400,000 poods (296,000,000 of pounds, or 132,000 tons) is produced every year; four-sevenths of it being destined for the consumption of European Russia; two-sevenths for Asiatic Russia; and one-seventh for the neighbouring states, lying on the S.W. As the total population of the Russian empire is estimated at 53,000,000, we shall find that, with reasonable estimates for the adjacent countries, the whole population to be supplied amounts to about 70,000,000; and, consequently, that, in this quarter of the globe, every individual is furnished with at least 4·1 pounds of iron. The iron thus dispersed from the Ural would, if collected into one mass, constitute a sphere of only forty-seven feet diameter; and, if we assume the ores raised at five times the quantity of iron produced, we shall see that the diminution of the beds of the Ural will not exceed the contents of a sphere of 380 feet diameter in one hundred years.

The result of this calculation will, as usual, only furnish another instance of the insignificance of human operations; for a globe of this size would not quite equal the dimensions of the Blagodat, as far as the ores are exposed above ground; so that many centuries must pass away before it will be necessary to go beyond the metallic accumulations which present themselves to view. The value of the yearly production cannot be estimated at more than 15,000,000 of roobles; for, though a pood of Ural iron sells at four or five to eight roobles*, for export to Bokharia,

* In the course of trade with the Bokharians, as well as with the Siberians, the unit of quantity, as applied to iron, is as much as will make one half of a load for their beasts of burthen; so that the Bokharian

the price, for home consumption, is rarely above two roobles.

The terminology adopted in the Bokharian trade, furnishes an example of a somewhat enigmatical formation of words. The ordinary and the better sort of iron are distinguished among them, by the names, Kurban-temir and Fedot-temir; of which the last word alone is the specific denomination of iron. Fedot is nothing more than the Christian name of an overseer (Fedot Akhmatov) of the mines belonging to the family of Lugin, of Tula, who raised the iron of Slatoust, Miask, and Kusinsk, to so high a character among the Bokharians, that, though the mines have frequently passed into other hands since his death, the iron still retains his name. The prefix, Kurban, is, upon a similar principle, derived from the name of a Tatar merchant, one of the early dealers in this commodity at Troitsk.

The produce of copper, though far inferior in quantity, is still, considering the value of the metal, of no little importance, and amounts to 183,000 poods in the year. Half a (camel's) load of this will bring, in Bokharia, from eighteen to nineteen ducats, or from 36·2 to 38·2 roobles the pood; though this quantity, in internal traffic, and even when rolled into sheets, is not worth above thirty-three roobles, and is only coined into thirty at the mint in Yekaterinburg. This low nominal value of copper, in Russia, is the more remarkable, as the private proprietors of mines themselves find it impossible to offer it at less than sixteen roobles, so as to cover the expense of production. We now add the gold and platinum*, and

unit is usually half a camel-load, or about eight Russian poods. This, in iron, would cost from 2¼ to 4 Bokharian ducats; 72 of which make 100 Dutch ducats, or 1155 roobles.

* See p. 271.

have, for the yearly total of metal raised on the Ural, a weight of 7,584,000 poods, and a value of

15,000,000 roobles, for iron;
5,490,000 - - - copper;
and 15,000,000, gold and platinum;

collectively 35,490,000 roobles, or about 5,397,000*l.* This gross income receives a further augmentation from the salt, yielded by the salt-springs between Kungar and Solikamsk, which rise through artificial borings carried into the lowest beds of the mountain limestone.

On a sea-coast, it would require 361 vessels, of 400 tons each, for the transport of a similar quantity of minerals; so that this may serve to give us some idea of the power and materials expended upon an infinitely more laborious river navigation.

It is to M. Eversmann that I am indebted for the following details regarding the river-fleets, which form so important a picture of the industrial scenes on the Ural.

The vessels used for carrying the produce are flat-bottomed, with straight, nearly parallel sides, about 120 feet long, and twenty-five feet broad, and terminated, at both ends, in a sort of obtuse triangle. Two pilot boats (Lotsmanskie barki), of lighter and rounder build, attend each fleet, and are manned by expert crews, who are to conduct the vessels of burthen through the difficulties of the navigation. Besides this, each of the larger craft is provided with a small boat, for carrying out warps and other such services.

A large portion of the mining population is employed, during the winter and spring, in preparing these vessels; and such is the versatility and mechanical talent of the Russians, that nothing is required from the European markets in their construction but sails and cordage.

Fir is the wood exclusively used on the southern Ural, and the vessels must be built a year before they are launched; not only that they may become lighter and more capable of bearing a heavy cargo from being dried, but because it is observed that they are then less liable to leak. This precaution is not so necessary with the pilot boats, which are sometimes built in such haste, that the planks have not been on them five days before their departure from Slatoust, and yet time has been found to tar them and furnish them with oars before they are wanted.

The 20th of April is the day fixed for the commencement of the boat voyages from Slatoust. The ice has by that time left the rivers, now swollen by the melting of the snow, which has already disappeared from the plains, and only lies in patches on the uplands. One of the vessels of burthen bears the title of Kazennoi bark, or commodore ship (from Kazein, a chief), and is occupied during the voyage by the proprietor of the factory, or his supercargo. It is distinguished from the others by its more commodious appointments, and it likewise carries a flag at the bow, and iron cannons for firing signals. Conformably with Russian usage, a solemn mass is celebrated on the deck, and all parts of the vessel are blessed by a priest the day before their departure. Each of the flat-bottomed boats receives a cargo of 4000 poods of iron at first, which is afterwards increased, on the rivers below the mountains, to 10,000 poods.

The men go ashore every night, and the fleet which M. Eversmann accompanied took fourteen hours to reach the Satkinskyi pristan (hythe, or landing of Satka), a distance of 200 versts from Slatoust*:

* This would give the Ai a current running nearly eight geographical miles an hour.

several of the vessels, however, suffered damage on the voyage, and were left behind. Mounted attendants were stationed along the banks, under the orders of the commodore, and salutes were fired on passing the residence of a Bashkir chief.

The stream being swollen, not only by the melting of the ice, but by the discharge of the superfluous water from the mine-pond of Slatoust, much caution was required in passing the foot of the Kassotur, where there is a sharp bend in the channel of the Ai; and another critical point is near the second factory of Nijnei Slatoust, where the sluices open under a bridge, with a heavy fall of water. The narrow valley through which the river passes is hemmed in by hills covered with pine, birch, aspen, and alder, with here and there patches of meadow. After leaving Kusinsk, thirty-five versts in a direct line from Slatoust, the sides of the valley become steeper, where they consist of bare calcareous rocks: the structure of this rock as described to us, and the consequent characteristics of the landscape, bring to mind the features exhibited by the basin of the Lena, between Irkutsk and Yakutsk. It is of a bluish colour, the dip of the strata tending eastward, at various angles of elevation, and sometimes even taking a vertical position, with frequent cavities in the face of the cliffs. Between three of these, called the Three Brothers (tri bratia), the Ai passes with a very tortuous course, just below Kusinsk. The inclination of the strata diminishes gradually till it coincides with the horizon, forty versts below Slatoust; which is the more extraordinary, as there is a spot near the mouth of the Satka, which flows from the S., where it is perfectly vertical. The bed of the river is again confined here by a bluff, called the Medvezhyi Lob, or Bear's Forehead, which is dangerous to the navigation.

At Satka two vessels join the fleet from Kusinsk,

while the cargoes of those from Slatoust are increased by from 4000 to 8000, or even 9000 poods, out of the magazines belonging to the factories at Satka, which is twenty-four versts from the wharf, or hythe. Eleven men are shipped here for every 2000 poods of lading, to work the two oars which are fixed at each end of the vessel.

The hythe of Satka furnishes millstones, cut from a mass of quartz which traverses the limestone. Just below this place, the right bank of the river rises perpendicularly from the water, at the entrance of one of the largest caverns noticed on the Ai. As the course of the river is direct there is no danger in this part; not so with the maloi and bolshoi pritest*, ten versts lower down the valley. Here, two precipitous rocks occupy the left bank, rising from 100 to 200 feet above the water; and the vessels are hurried along by the foaming stream for a distance of 1200 paces close to their feet. The strata of these rocks are parallel with the surface of the river, but the greater is rent into enormous columns, by vertical fissures; while the less is so regularly divided into square compartments, as to offer an exact resemblance to an artificial wall. The fissures are coloured with dark streaks of decomposing sinter (a trifling peculiarity which I have seen repeated on the Lena); caverns open on many points, and pines shoot up the steep face of the cliff from every projection.

The sides of the valley now sink again; but at $1\frac{3}{4}$ and $2\frac{1}{4}$ hours' voyage from the landing-place of Satka, dangers re-appear. The first is caused by a low rock on the right,—the Ratsboinik, or Robber,—which stretches twenty feet into the river; just where it makes a sudden bend; the other is owing to a

* *Maloi*, little; *bolshoi*, great; *pritesnit*, to narrow, *Russ.*

sharp reef, entirely under water, and connected with the opposite or left bank.

Towards the middle of the second day, the village of Lekle is approached, situate on the left; and now, not only the landscape, but the circumstances of the navigation, assume a different character. The low and argillaceous heights, which terminate the valley, recede, and leave a tract of steppe between them and the water. The channel of the river dilates to five times its original width, and shoals and banks endanger the navigation, instead of rocks and cliffs. Many of the vessels grounded, and the others were obliged to come to, in order to render them assistance, the following day.

The crews collected round their watch-fires, on the shore, to enjoy themselves; playing on the balalaika (p. 116.), or drinking the sap of the birch, which they drew from notches cut in the trees.

Shallows and islands are so numerous, where the river spreads into the plain, that the channel has to be sounded, and its safety ascertained, every season. So serious are the impediments besetting the navigation of these shallow, changeable waters, that they would be insuperable to boatmen accustomed only to the permanent rivers of Europe. The artifices which the Russians so naturally seem to practise in similar difficulties, is exemplified by the history of their early adventures in Siberia; where Yermak is said to have dammed up the Serebrenka* with the sails of his ships, which he spread across its bed in order to raise the water on the shoals.

One arm of the river makes a wide sweep into the plain, just below Lekle, and, after forming a round island, rejoins the main branch in a totally opposite direction. This spot has received the name of Mo-

* An affluent of the Chusovaia, see p. 246.

nakhin Prorva*, or the Monk's Breach, being the scene of the first stranding of a vessel, which was caused, according to popular superstition, by the presence of a monk, which always forebodes ill luck.

Bashkir dwellings overspread this plain, and tracts of burning grass were seen in the neighbourhood. Mowing is unknown in these steppes; and the grass, which is trodden down by the cattle, would rot and destroy the succession of crops if it were not set on fire, when dried by the sun. These fires often extend to the forests, and cause incalculable devastations.

At Lekle seven men are discharged from each vessel, and as many more on the following day. At the confluence of the Ai and Ufa fourteen more are dismissed; so that twenty-two remain in each boat, to complete the voyage to Ufa, on the river of the same name, at its junction with the Bielaya. The remainder of the original boatmen are now sent home, and the vessels are manned by hired Votyaks, none of the individuals from the mines being retained but the owner's deputy, or supercargo, and the most experienced of the pilots from Slatoust. The voyage is once more continued, down the Bielaya into the Kama, till Laïshef is reached, not far from where the Kama falls into the Volga. Laïshef is not only the general rendezvous for all the boat-fleets from the northern and southern Ural, but is also the point where a total change must take place in the mode of prosecuting the journey. For now they leave the smaller rivers to commit themselves to the wider waters of the Volga; and all those bound to Nijnei Novgorod, or St. Petersburg, must prepare to toil against that great stream.

All the other factories of the southern district

* From *prorvat*, to tear through, *Russ.*

communicate with the Kama by the Ufa (N. E. of the Ai), the Yurusan, and Bielaya (S. W.); those of the north descend the Suilva, and Chusovaia, notorious for its rugged banks and rapid sinuosities.

Every proprietor has his own storehouse, at Laïshef, for the equipment of his vessels; for it is only now that the boats are rigged, and fitted with a railing round the deck. The masts are frequently cut by the people from Slatoust, as they come through the forests on the Ufa; and agents from the mines have already hired men for the ascent of the Volga. Thirty are required for every vessel, so that this species of transport gives employment to 20,000 men altogether, who are collected from a distance of 200 versts round Laïshef.

Tracking is unknown on this route: the boats are warped along by a windlass and hawser, which is shifted from anchor to anchor by the attendant skiff. It is only on board of the salt ships, from Solikamsk, that the Stroganovs employ horses to turn the windlass, all the others avail themselves of the cheapness of human labour.

The caravans leaving the Ural at the breaking up of the ice reach N. Novgorod, at the fair time (p. 127.), in about 100 days. There have been instances of their reaching St. Petersburg in the course of the same autumn; though mismanagement obliges many of them to winter at Vuishnyi Volochok.

It is not easy to deduce the entire length of river way which these heavy cargoes of merchandise must pass over from the water-partition between the Caspian and the Icy Seas, till they arrive at the Baltic, after crossing the depressed region near Vuishnyi Volochok, where the water-course changes again. If we suppose that, at distances of ten versts, on the best maps, we might assume correct points of departure

between which the channel of the rivers may describe a right line, we should then compute the length of —

	Versts.
The Ai, from Slatoust to Ufa, at - -	420
The Ufa, Bielaya, and Kama (Ufa to Laïshef) -	580
The Volga (Laïshef to N. Novgorod) - -	360
The Volga (Novgorod to Tver) - - -	700
The Tverza and Shlina (Tver to Vuishnyi Volochok)	130
The Msta and Volkhov (Vuishnyi Volochok to the Ladoga) - - - - -	480
From the Ladoga to St. Petersburg - -	130
Or, from Slatoust to St. Petersburg - -	2800

or about 1850 miles.

But actual experience proves that this mode of calculating a series of rectilinear distances falls far short of the true measure of the winding river line; for, according to the most intelligent pilots and travellers, the journey from Slatoust to Ufa cannot be less than 1000 versts, while they estimate the voyage from Ufa to N. Novgorod at 2000 versts, which our computation would reduce to 940. This somewhat startling assertion of the watermen derives some confirmation, however, from the fact of their reckoning giving an augmentation of nearly two and a half for the windings of the rivers on the hilly part of their course, but little more than two * when they flow through the more level districts; as it is only natural that, while the body of water is inconsiderable, its direction should be altered by every projection or obstruction it may encounter, much more than when it rolls in a heavy stream through the soft and uni-

* That is, as compared with assumed polygonal lines of ten versts. The increase of distance is, in some measure, accounted for by the observation, that the segments, of which those assumed right lines (of ten versts each) are composed, will in nature be often found to deviate at an angle of 65° 4′ in the highlands, and of 61° 6′ in the levels; or that they will form an angle with each other of 49° 2′ in the first case, and of 56° 8′ in the second.

form soil of the plains, where there is nothing to cause a deviation of its channel, but the sand or beds of gravel which it may have washed from the uplands.

That those opposite circumstances are not found to produce results still more palpably at variance, may be owing to the excessive frequency of the sand islands formed in the Volga, below the Kama, where its banks are protected from inundation on one side only by their height. I am myself, therefore, but little disposed to question the accuracy of the Uralian boatmen's statement; and must look upon 5000 versts (about 3350 miles) for the river line between Slatoust and St. Petersburg, as coming much nearer the truth than 2800, which may rather be taken as a minimum limit. The estimate of the pilots is, moreover, founded on the observation, that a vessel without oars, will make 6·5 versts in an hour on the Bielaya, below Ufa; in the Kama, only 4·0; and in the Volga, 4·3; going down the stream, between N. Novgorod and Kasan.

Thus we have an extent of more than 3000 miles, over which is spread a system of navigable waters without the co-operation of man; the only instance of his interference being at Vuishnyi Volochok, where one of the natural channels is widened, and a sufficient supply of water secured by sluice-gates. No other nation, however, but the Russian, could be found so inured to toilsome enterprise as to avail themselves of this natural provision for traffic; for though, on the one hand, the laden vessels have a fall of at least 870 feet for their voyage from the Ural to Laïshef *, it is, on the other hand, to be considered, that they have

* Laïshef is eighty feet above the level of the sea, and none of the furnaces on the Western Ural can be less than 950. The Ai at Slatoust lies 1370 feet above the sea, or 1285 above Laïshef.

the discouragement of an ascent of no less than 580 feet up the stream from Laïshef to Vuishnyi Volochok, and to contend with rapid currents for full 1500 versts. Even the last portion of this navigation — the passage down the Msta into the Baltic — is not without danger, from the rapidity of the stream, and requires the assistance and experience of the neighbouring pilots.

It has been already remarked (p. 79.), that an impediment existing at one point of this extraordinary line of navigation, deprives it of half of its utility; the cataracts below Bronitsui are the only obstacle to the return of the vessels from the Baltic to the Caspian, or even to the Ural. All the boats are broken up at St. Petersburg, and sold for fire-wood. This causes a serious yearly loss in labour; the consumption of timber on the Ural is not affected by it to the extent of more than a thirtieth. *

The greater number of these boat-fleets are destined for the mother country; but there are some, which take their freight to Taganrog, where it is disposed of to the Turks. These vessels continue their course down the Volga to Tsaritsuin (lat. 48° 6′), where this river approaches within forty miles of the Don. Here the Russians avail themselves of the facilities of a Volok †, after the most primitive fashion. The vessels are taken to pieces, and with their lading trailed on waggons across the isthmus. The wastefulness of this proceeding is said to raise

* Each vessel requires about 6000 cubic feet for her construction, so that 600 consume about three millions and a half of cubic feet; and, as 100 poods of iron take one cubic sajene (343 cubic feet) of charcoal, or 1000 cubic feet of wood, for smelting, the entire Uralian product of iron will require 89,000,000 cubic feet; and this, in the subsequent processes which the iron undergoes, must be increased till it becomes at least thirty fold of the quantity required for the boats.

† Volok is an isthmus or portage between two navigable rivers, and is, perhaps, a derivative of the Russian verb signifying to roll or trail. See p. 79.

the price of iron at Taganrog by seventeen roobles the pood.

The surface of the Don must be more than 235 feet above that of the Volga at Tsaritsuin — a difference as great as that of the level of the Black Sea above the Caspian — the Volga having scarcely any observable fall thence to its mouth, while the current of the Don is comparatively rapid.* This would render the communication between these two rivers, by a canal, somewhat tedious, though the work has been frequently projected. The waves on the Volga are sometimes so high as to endanger the vessels, which are, perhaps, better constructed now than they were in the sixteenth century. Notwithstanding this delay at Tsaritsuin, the caravans reach Taganrog in fifty days from Laïshef. One of the master-boatmen accompanies each vessel from the Ural to its destination; but the men for working the passage are mostly from the government of Novgorod†, who wander, every year, as far as Laïshef, where they are employed in preference to all others. From personal acquaintance with the characters of the nations on the Black Sea, the Uralian miners give the Turks the appellation of Blagorodnie lyudi — upright, properly, well-bred people. The Greeks of Pontus enjoy a very different reputation.

* Since this was written, it has been ascertained that the level of the Don at Kachalinsk, is not more than 175 feet above that of the Volga at Tsaritsuin, and that the difference of level between the Black Sea and the Caspian is but 83·6 feet. See Parrot's "Journey to Ararat," pp. 312. and 369. — Ed.

† The most expert of the Russian sailors are from Nijnei Novgorod.

CHAP. XIII.

EXILES IN YEKATERINBURG. — KOSAKS OF THE URAL. — THE BASHKIRS — THEIR CARELESS LIVES — LOVERS OF FALCONRY — PROBABLY THE ARGIPPÆI OF HERODOTUS — DERIVATION OF THEIR NAME — THEIR RELIGION — PECULIAR MODE OF BURIAL. — EVILS OF LOG-ROADS. — DEPARTURE FROM YEKATERINBURG. — SUGAT. — ATMOSPHERIC CHANGES. — TYUMEN. — THE LIMITS OF THE LIME-TREE. — THE NELMA SALMON. — GREAT FERTILITY. — FLIGHTS OF BIRDS. — YUJAKOVA. — EXHORTATIONS TO THE HORSE. — THE IRTUISH. — ARRIVAL IN TOBOLSK.

BEFORE we proceed with the narrative of our journey to the eastward, we have a few more particulars to communicate regarding the inhabitants of the neighbourhood of Yekaterinburg.

Parties of exiles are a very usual spectacle in the streets of the town: their number is rated at 5000 passing through in a year, or ninety-six every week. The women are generally in waggons: the men follow two and two on foot, and during their stay in the town have usually chains on the leg. Though the inhabitants are accustomed to such sights, they regard them with compassion, and will often call them to give them alms. Their guards are generally Kosaks of the Ural, as they are called, and a company of Bashkir militia, entitled Druzhina (a company of friends) in Russian. The Uralian Kosaks are in complete uniform, well armed and mounted. They are supposed to be the descendants of the conquerors of the country, under Yermak, and are thence invested with the same privileges as are enjoyed by the Kosaks of the Don. They are allowed an immunity from every impost; but are bound to devote themselves to the public service. Certain villages, to the eastward of the Ural, have been assigned to them, with hereditary

rights. The Bashkir companies constitute a body as different from the Russian soldiery in feature and aspect as they are in costume. They retain their national pointed broad-brimmed hat of white felt, and close tunic of cloth of the same colour, with red embroidery on the edges. Their arms are a pike and sword, besides the bow, in the use of which the tribe is so expert that they have not yet found it expedient to lay it aside.

Since the invasion of the Russians, the Bashkirs have never extended the northern limits of their residence beyond Yekaterinburg. Between the latitude of this town and that of Slatoust, they form the chief part of the population. Southward of this, between Slatoust and Troitsk, they are intermingled with the Tipters, Mecheryaks, and Chuvashes. Even in the first-mentioned district, where they have their principal settlement, they are always found at some distance from the mountains. The pass which leads over the Ural, near Slatoust, is the only part of the highlands where they settle: they seem to shun the vicinity of the mines or factories. * The route from Slatoust, or Miask, to Yekaterinburg, which runs close to the mountains, passes exclusively through Russian and Tatar villages; but a circuit to the eastward will bring the traveller to Chelabi and to the country of the Bashkirs, properly so called. It is distinguished by the Russians into three cantons, as they are termed, over each of which a chief presides, who changes his residence from time to time, and generally engages the assistance of a sort of minister, of Russian descent, for the advantage of the national connection. This diplomatic post is most commonly filled by some ignorant adventurer of the lowest

* They spread themselves now on the southern half of the Ural, as far west as the meridian of Ufa. They sold the upper country to the Russian government, as soon as ore was discovered there.

class. The powers of the hereditary chieftains are nearly commensurate with those of the volostnoi ispravnik * in the Russian provinces. The direct intercourse with the imperial government is maintained through a Russian officer entitled tsemskoi ispravnik †, whose custom it is to follow the nomadic court.

There is no aboriginal Siberian tribe besides the Bashkirs of Perm and Orenburg, that now presents the interesting phenomenon of a mode of life regularly alternating from the nomadic to the fixed; every section of this community having a permanent village of wooden huts, on the borders of some wood, where they pass the winter. As soon as spring sets in, they betake themselves, with their horses and herds, to the plains. Each family has its tent-cloth of hair, which is rolled up and carried at a horseman's saddle. They rarely encamp quite separately, but unite into companies, and pitch their tents in military order. Their cattle wander where they will, and are only occasionally collected at their owners' dwellings. Horses are indispensable to the Bashkirs, who seem never to leave the saddle. Indefatigable and dexterous on horseback, they are indolent and indocile everywhere else.

In the summer pastures the grass sometimes reaches to their saddle-girths, still the Bashkir never thinks of provision for the winter; the cattle must then sustain life on the stunted herbage that may appear through the snow, or on the remains of the summer fodder that rots on the dunghills. The only occupation of the men, in summer, is to drive the mares home to be milked; the management of every thing else is left to their wives. The foals are separated from the mares

* *Volost*, a commune; and *ispravnik*, director, commander, *Russ.*

† *Tsemskoi*, provincial; and *ispravnik*, *Russ.*

at an early age, and tethered near the tents, being never allowed to suck while the mares are feeding. The milk is received in leathern bottles with a narrow neck, and left to ferment: it then constitutes the favourite beverage of the Bashkirs. Russians, who have had opportunities of proving its qualities, extol it, not only for its flavour, but its wholesomeness: many prefer it to every other sort of diet; and invalids frequently have recourse to it, with the best effect upon their health. This remedial agent enjoys the same repute here, in cases of consumption and diseases of the skin, as it does among the Kirgis, according to the report of Sievers.* The Kirgis, as we afterwards learned, attribute a peculiar efficacy, in those cases, to the richness of their mutton; and should this observation prove correct, the cures experienced among the Bashkirs, may be referred to their constant use of mutton. A kettle of it, cut into small pieces, hangs constantly over the fire, in their summer tents, and every visitor is presented with the favourite bish-barmak.

Fishing also is not neglected by the Bashkirs: whatever they take is dried for winter provision.

They are exceedingly successful in training hawks, a smaller species of which is used for taking hares, while the greater (Falco chrysaëtes), will strike foxes, and even wolves. They do not confine themselves, however, to rearing hawks for their own necessities or pastime; but carry on a profitable trade in them with the Kirgis, who are even more passionately devoted to this sport than themselves, and who are always eager to purchase trained birds from the mountaineers. The average price of a well-trained hawk is estimated at 50 roobles.

The fruit of the bird-cherry (Prunus padus) has

* Pallas, Nord. Beiträge, vol. iii.

already been alluded to (see p. 211.), as constituting an important article of vegetable diet with the Bashkirs; and it may not be uninteresting to revert again to the passage quoted from Herodotus, in proof of the identity of this tree with that which supplied the wants of the Argippæi. In this passage we are informed that the fruit is called ἄσχυ (aschu), by the people of the country; and it is remarkable that the Bashkirs denominate every acid, especially the sour juices which they mix with their milk, by a word that is written atchui* in Russian, and call the cherries themselves, tchia, a word formed, probably, from the same root. As the Asiatic sound, tch, could not be exactly represented in Greek characters, they would be driven to attempt it by adopting their own softer combination, sch. However bold it may seem to affirm the existence of any national usage for a period of 2000 years, it would be much bolder still to maintain, that the employment of similar words to express similar ideas was a merely accidental coincidence, and that the statement of Herodotus could have no reference to the actual practices of the modern Bashkirs.

After speaking of the inhabitants of the plains lying north of the Black Sea, Herodotus proceeds to say, "Beyond these (to the eastward) lies a rugged and rocky district of considerable extent: when this is crossed, we discover a race of men who inhabit a high mountain tract. They are said to be without hair on their heads (φαλακροὶ) from their birth, and to have flat noses (σιμοὶ), and prominent chins (γένεια μεγάλα): they speak a language of their own; but wear the Scythian dress." † Not only is the situ-

* The word for sour, among the Tatars of Kasan, is atchi; bearing a striking resemblance to the Latin, acidum; and the Greek, ὀξύ. The Sclavonian is quite different — kisloe.

† Herod. lib. iv. cap. 23.

ation of the country of the Bashkirs precisely described in this extract, but the characteristic features of the people particularly noticed. The story of their want of hair is probably to be set down as one of those exaggerations or misconceptions, from which the relations of travellers are so rarely free. Even at the present day, the custom of shaving the head and using depilatories on other parts of the body, is invariably observed by the Turkomans and several Mongol tribes in northern Asia: we shall have to allude to the early origin of this practice among the Tatar neighbours of the Bashkirs, in a subsequent chapter. Such an observance may as readily have been mistaken by a passing traveller for a natural defect, as another peculiarity may have given rise to an error, just the counterpart of this, in modern times. It is very common to see the children of the Russian boors in the cool days of autumn, with their arms drawn out of the sleeves of their long white smocks; and, as they then conceal them by crossing them upon the breast, it is said that some hasty traveller spread abroad the report that Russian children are born without arms.

Another weighty argument is, that the national appellation may, with great probability, be held to signify "the shaven heads." An etymology of this word has been adopted by European ethnographers, which seems utterly paradoxical both in logic and grammar. The first syllable of the name (the Tatar bash, head) admits of no controversy: the second is deduced from kurt, and made to signify a bee. To this we have to object that kurt, taken absolutely, does not mean a bee, but is the general term for insect, or worm, like the Russian cherv; iefak kurt (from iefak, silk) is the silkworm; kurt tsuigats, a maggot; kurt lahamen, to be worm-eaten. Accord-

ingly, the bee is bal kurt, the honey insect; from bal, honey. This distortion of Bashkir in Bashkurt can at best, imply nothing but bee-head — an absurd compound to signify one who tends bees. It is strange that the following more plausible derivation has not hitherto been proposed: — The second member simply means shaven, from kuirghamen, I shave (amen being merely a syllable of inflection, including the pronoun I), and having its participle, kuirmuish, shaven. Thus, we shall render the gentile name, Bashkir, as written by the Russians Bashkuirtsi, by its natural synonym, shaven heads; to which we may add, that the adjective φαλακροὶ is likewise used by Herodotus, in a subsequent part of his narrative *, as a proper name of a nation living near the Ural; so that he makes this appellation equivalent to ἀργιππαῖοι.

It is equally probable that the language of the Turcomans, which is still, as then, spoken by the Bashkirs, may have been different from that of other nations occupying the southern parts of European Russia — the Scythia of Herodotus †, notwithstanding the similarity of their costume. With regard to this latter, it is well known that the dress of the Russian horsemen, in the sixteenth century, bore a close resemblance to that of the Bashkir and Kirgis. Herberstein's drawings represent them in boots with high heels, and the points of the toes turned upwards, which are at present considered as peculiar to the Tatar tribes. The saddle of the ancient Russians was

* Capp. 24, 25, *sub init.*

† The words φωνὴν ἰδίην ἱέντες of Herodotus seem to point to the force of utterance, which is said to be a striking characteristic of Bashkir speech. The Russians describe this peculiarity as giving every sentence uttered by a Bashkir the intonation of a question; just like the acute accentuation of the words at the conclusion of a period, for which the Jews are remarked in Europe. We shall have to notice this again, in our account of several of the Northern Asiatics.

exactly like that of the modern Bashkirs, even to the leathern holsters in which they carried their provisions. The sort of shirt worn under their other dress was, according to the same authority, decidedly Tatarian, differing from the European in the gaudy embroidery on the upper edge, which, though not now seen in Russia, is common among the Bashkirs, and retained likewise among the Mordvi and Cheremisses (see pp. 114. 135.), with an opening invariably on the side, instead of the breast. This, we are told, was originally worn on the same side by the Russians till their conversion to Christianity, when they resolved to have the opening on the right, to distinguish themselves from the Tatars who have it on the left side.*

"They derive their sustenance from trees," are the words of Herodotus, which introduce his description of their mode of preparing the atchui from milk and cherries, and of kneading the residue of the fruit into cakes; and then, as if in explanation, he makes the remark, equally applicable to the modern Bashkir, that "they are not possessed of much cattle, for they have no knowledge of artificial pasture-land (σπουδαῖαι νομαὶ")."†

* Even to this day, the Russians make it a point to have the opening of the shirts, which they call kosovorotki, — bias-cut, or bias-collared, — on the right shoulder; whence, probably, the popular expression for any thing contrary to common sense or usage, "that the collar opens on the wrong side."

† The other words in this passage, "Ποντικὸν μὲν οὔνομα τῷ δενδρέῳ ἀπὸ τοῦ ζώσι," can admit of no other translation than "the tree on which they live is called the Pontic," which will be sufficiently clear if we bear in mind that the Greeks gave the name of Pontic to every thing coming from the neighbourhood of the Black Sea, to the northward of their own country. This may surely have been the case with the Prunus padus. Herodotus had his entire account through the Scythians and Greeks who frequented the Pontic trading towns (see lib. iv. cap. 24.), who would naturally point out the tree upon the spot. The fruit of the hazel (Corylus avellana), for the same reason, got the name of the Nux Pontica. It seems a strange misconception of the commentators that they should all attach such importance to the denomination Pontic tree, which has

The Scythians of those days seem to have been as much surprised at the improvidence of their neighbours as the Russians are at present; and their report may have produced this remark about the pastures (νομαὶ). Their tents (of white felt) is another point of co-incidence with the actual state of things. Some trifling deviation may be attributed either to an alteration in customs or to the easy faith of the ethnographer. At this moment it may be truly asserted of the Bashkirs, that they delight to live, winter and summer, under the trees; and that in summer they often dispense with tents, particularly upon any excursion of unusual length. Upon these occasions, their only provision is a leathern bottle of sour milk, and the night is passed in the woods, without any covering but what nature affords. We have also to recollect, that their winter huts only date from the period of their first intercourse with the Russians, by whom they were supplied with axes for felling the timber; and this will again justify the assertion found in Herodotus, that "every one lives under a tree, which he covers in winter with a felt-cloth; but in summer, even this is laid aside." It was an error, however, to say that the trees were covered with felt and not the tent-poles underneath the trees. The same character for hospitality and scrupulous uprightness in their dealings by which the Bashkirs were so honourably distinguished in former ages, is

really so little to do with the true import of the passage, and persist in referring it to the hazel nut. How this fruit could be said to have stony kernels (πυρῆνα), or a dark and viscid juice, or to leave dregs (τρύγες) that could be compared to pressed figs, are questions which they never appear to have entertained. Notwithstanding the learning of Larcher, his exposition is not more happy than that of the rest: he considers the fruit in question to be the Cembro nuts (from the Pinus cembra). Though the cedar oil of the Siberians (kedrovoe maslo) is never used with milk, it would not be so absurd to suppose it meant here, but for the positive assertion of Herodotus, that the fruit had a stony kernel, covered with a soft pulp.

as justly their distinction at this day. As they carry no weapon but the bow, it may be asserted, with some degree of truth, that they go unarmed. They were found, at the first visit of the Russians, to have some forms of administrative justice; so that it is not at all improbable that they may have been sometimes chosen as referees in the quarrels of their neighbours.

It remains to offer some observations upon the appellation Argippæi. There can be little doubt that it denoted a peculiarity observed in their district, and was seized on by the Greeks as the proper name of the people; Argippæi meaning nothing else than riders of "white horses." A similar instance of the application of a gentile designation from the colour of the cattle is offered in a Tatar horde, who, at the time of the conquest of Siberia, were known as the pegaya, or dappled horde. The extraordinary number of white horses among the Mongol Tatars of Eastern Siberia, is a very striking phenomenon to a traveller coming from the West: we shall have further occasion to notice this predominance of a breed of grey horses in the progress of our journey towards Kamchatka; but still there is a remarkable tendency to this colour throughout even the western tribes. White horses are common among the Bashkirs and Kirgis; and, being beautifully dappled, sometimes with dark round spots, are eagerly bought up by the Bokharians, who call them argamaki, and carry them to the Indian markets.* The colour of the Circassian horses, too, is so often greyish, as to contrast obviously with the chestnut of the Russians. All this tends to render it highly probable that grey was once the decidedly prevailing colour of the Siberian horse, though now much modified on the European border. This colour is still

* Pallas, Zoogr. Ross. i. 239.

pure among the Yakuts, where the Russian breed has not yet penetrated; and their horses will naturally preserve it longer than those of Western Tatary, where it may totally disappear in time; just as the use of dogs for drawing carriages, which was universal between the Dvina and Pechora in the eleventh century, and is known to have existed, at least in the district of Verkhoturie, as recently as the time of Marco Polo.

The Russians themselves, accustomed as they are to the comforts of artificial society, are obliged to bear testimony to the enjoyments of the careless roving Bashkir life. Whoever has once known the charms of long and uncontrolled wandering on horseback through scenes of nature, will readily enter into the feelings of the Bashkirs obliged to return to their winter habitations. They approach them with reluctance, and believe that Shaitan, or the evil spirit, has taken up his abode in the huts that oppress them with such a sense of constraint. The men accordingly remain at some distance from the settlement, and send the women forward, armed with staves, with which they strike the door of every hut, uttering loud imprecations; and it is not till they have made the rounds with their noisy exorcisms, that the men ride forward, at full speed, and with terrific shouts, to banish the dreaded demon from his lurking-place.

With these peculiar observances, there was sufficient evidence of the intellectual advancement of the Bashkirs, even before the introduction of the Mohammedan faith. Their present religious ceremonies are such as are prescribed by the Koran. Their priests are called Mullas, one of whom accompanies each party in its wanderings, and directs their prayers, which are repeated several times a day, in an enclosure set apart for worship, but not covered. Contrary to the usual

Mohammedan practice, they do not bury their dead in cemeteries, but in any spot chosen by their dying friends. A passage leads, from the bottom of a sort of shaft, into a little chamber, where the corpse is fixed in a sitting posture, upon a seat formed of stones.

Among the mechanical productions of the Bashkirs may be mentioned a sort of flute, with four holes, about two and a half or two feet long, and open at both ends; the holes are all in that third of the instrument next the mouth. Their own name for it is chebuich, or kúrai-tàn.* In playing, the principal orifice, which is at right angles with the axis, is pressed against the teeth, slightly opened; and while the melody is produced by the reverberations in the pipe, it is accompanied by the player with a base formed in his own throat. Notwithstanding that this instrument requires much breath, they will sometimes prolong the tones for more than half a minute, when they conclude with a sort of sneezing sound, by forcing the last portions of the air through the nose: this is, however, a point of perfection that but few arrive at. Herberstein notices a similar sort of flute as in use among the Russians. Their name for it was churna; but it is not now known in Russia, nor was it of Sclavonian origin. The Turcoman kurai has some resemblance to it in sound.†

The use of the Arabic characters was introduced among the Bashkirs, as well as the Tatars of Kasan, along with the Mohammedan religion: they are said to use them, not only for religious purposes, but in transcribing their historical songs. We have, unfortunately, little satisfactory information to expect

* The first of these terms has an affinity with chubick, the Turcoman name for the reed of a tobacco-pipe. The Kurai is a musical wind-instrument, known to the Tatars of Kasan also.

† Comment. rer. Moscovit. Basil, 1571, p. 54.

with regard to the ancient, and, probably, highly perfected writing, found engraved on the rocks in the valley of the Puishma, by the Russian conquerors of Siberia, and which has been carefully copied by Strahlenberg.* The identity of particular parts of this inscription with another, found in a similar situation, on the Taunton (forty-five miles from Boston†), invests it with peculiar interest; the more so, as the characters on the Puishma are far more elegantly formed than those discovered on the northern slope of the Altai, on the Charuish, and in the government of Krasnoyarsk, near Abakansk (lat. 54° 2′), and on the banks of the Yenisei.‡ These latter bear a striking resemblance to the notch-ciphers, generally rectilinear, but always simple, transmitted from father to son, in some of the families of the Votyaks and Ostyaks, as seals are in Europe; but, on the Puishma, the forms of the characters are much more complicated; and, in a technical point of view, are even far more elaborate than those of the Mongol alphabet.

September 30. and 31. — Our magnetic observations had been so satisfactorily prosecuted, both at Yekatarinburg, and during our progress on the Ural, that nothing remained to delay our journey eastward. Our party was now reduced again to its original number, as we were obliged to part with the attendant who had joined us at Kasan (see p. 158.), in consequence of a spinal disease, which had returned upon him during the latter part of our fatiguing excursion on the Ural. The violent and unceasing jerking of the tilegas on the log-ways, is said, not only to bring on a complete paralysis of the mental faculties

* Strahlenberg, Nord und Oestlicher Theil von Europa und Asien, p. 306.; and Sibirskyi Vestnik, 1820, part ii.

† Philosoph. Transact. 1714.

‡ G. Spasski, De Antiquis quibusdam Sculpturis et Inscriptionibus in Sibiria repertis. Petropoli, 1822.

of the Russian postillions in a few years, but is so frequently attended with results similar to the above, as to have obtained for these roads the name of spine-crushers (spinulomayushchie).

Upon applying at the sale-rooms of Yekaterinburg for winter covering for our feet, we were recommended to dust the inside of our boots with powdered quick-lime; so that the increased action of the skin might counteract the effects of the cold.

October 1.—We started at three o'clock, P. M., and had heavy rain all the way to Bielaiskaya, seventy-four versts distant. The route to Tobolsk turns southward from the Shartash lakes at this point; and still we discovered a prolongation of the granite seam that borders them, at a distance of six versts from this station. The country here is without trees: but well cultivated near the villages. As evening came on, the lights of pine splints (luchinki) were visible in the houses a great way off. The chamber of the postmaster at Bielaiskaya was divided into several compartments, with curtains; and its numerous occupants shared the floor with the travellers during the night.

October 2.—This day's journey was 122 versts from Bielaiskaya to Sugat. The first part of our road was turf, underlain, perhaps, by a continuation of the rock. The woods on this damp level were entirely of birch; and we saw people planting young trees of the same kind, in a double row, on each side of the way. Fifty versts brought us to the Puishma. Here the Uralian rock-formation had disappeared: the right bank of the river was flat; the left higher, elevated about eight fathoms, by earth deposited by the floods. This is a remarkable circumstance, which distinguishes the eastern slope of the Ural from the western: on the west we encounter floetz rocks, of the older formations, extending nearly 300 miles from the central

ridge, and at a considerable elevation above the sea; but on this side, we have the primitive rocks of Yekaterinburg, nearly vertical in their stratification, though falling slightly to the west, and suddenly terminating upon a bed of alluvial earth. We might, however, find the floetz strata at a great depth, covered with this deposit, though protruding so far above it on the other side.

The loamy soil, on the right bank of the Puishma, is well adapted for agricultural purposes, and is taken advantage of by the inhabitants of Kamuishlov, a little town just beyond the river. The stream, at Sugat, was so completely solidified by the frost, that every household was supplied with water from melted snow.

October 3.—Hence to Tyumen the country is level and fertile; but the harvest was finished, and the birch trees leafless. The meteorological changes were such as we had experienced the week before. The atmosphere was bright and clear during the night and forenoon; about mid-day the evaporation of the dews formed piles of thick clouds; at sunset rain fell; and at eight o'clock, the smallest stars were visible. Mokrova, where we reached the Puishma again, is twenty-four yersts from Sugat, and on the borders of the government of Tobolsk.

We were almost startled, in the evenings, by the luminous phosphoric appearance of the rotten wood: we had hardly entered the town, when we were compelled to take up our quarters in the factory of the Russian-American company, to whose agent we had despatched our letters from M. Prokofiev by a traveller who had preceded us.

We here witnessed a combination of the most primitive simplicity of manners with the possession of considerable wealth. The dignified appearance of our new entertainer was heightened by the plainness

of his national costume, and his long white beard. The walls of his apartments, as well as the furniture, were ornamented with designs and paintings from Tagilsk. His house was of stone, surrounded by the warehouses containing, among other valuables, a supply of tea, which afforded us a most agreeable refreshment upon our arrival. We shall reserve our account of the nature of the intercourse maintained between China and Europe by the agents of the Russian-American Company for a future occasion.

October 4.—The back part of our house (one of the three stone buildings in Tyumen) overlooks the steep bank of the Tura. The level of the river is twice as far below the plain here as that of the Puishma at Kamuishlov; a proof how rapidly the water level sinks as we leave the Ural. The soil of this alluvial tract is a yellowish mica, minutely powdered, totally free from quartz, and unctuous to the feel; so homogeneous, that there is not the slightest separation visible in its mass, even where the declivity is upwards of 100 feet high. Some gold is obtained, but in small quantity, from the high banks of the river at Tyumen, which may be looked upon as a proof that the pulverised earth has been washed from the Ural.

Luxuriant meadows, and beyond these the dark surface of well-cultivated fields, constitute the landscape on the left bank of the Tura. We have already noticed a similar constitution of the country on the Oder; except that the difference of level between the plains, on either side of the river, is greater here; as well as the extent of land upon the left bank, which receives the fertilising deposit from the Tura.

A market, held in the most populous quarter of the town, beyond the Tyumenka, was now to us not only a novel, but most interesting, sight. Two thirds of the traders were Tatars; wooden utensils,

of all sorts, were the chief articles of traffic: peasant cars, quite new and complete, were offered at four roobles; with pails, troughs, and scoops at corresponding prices.

There was a large supply of limebast too, and mats and cordage made of it. We had not expected to find this tree flourishing here; but it grows on the banks of the Linden-sea (Lipovoe ozero*), in lat. 57° 2′, forty versts from Tyumen. On the other side of Tyumen, this tree is never found northward of 56°, except at the sources of the rivers from the Tobol to the Tom; so that the Russians in Siberia have given up the custom of using the bast for shoes or sandals, and adopted the leathern ones worn by the natives. The efforts made to check the destruction of the trees, in European Russia, by the introduction of leather, have hitherto proved abortive.

The fish-market was plentifully supplied: we particularly remarked a species of salmon, unknown in Europe, and called here the nelma (Salmo Leucichthys *Güldenstädt;* S. Nelma *Pallas*), and great quantities of the roe, in wooden vessels. This is white and small in grain, and sold fresh: it is not salted till required for use. These roes and thin slices of the flesh are deemed by the Russians more delicious when raw than cooked, and are eaten as provocatives of appetite. Later experience taught us how much the influence of the cold tends to favour the adoption of raw animal food; so much so, that it hardly requires the addition of salt: in fact, during the intense frost, the raw flesh even of warm-blooded animals loses its repulsive qualities.

The burghers of this town have a great appearance of prosperity: they have handsome equipages, and even a billiard-room in one of the hotels.

* From *lipa*, a linden, or lime tree; and *ozero*, a lake, *Russ.*

The Archimandrite of the church was a native of Little Russia, and justified, by his lively wit, the character which his countrymen enjoy. One of our most intelligent acquaintances was M. Sosipater Silin, a native of Surgut (on the Middle Obi, in lat. 61° 2′), and settled as a merchant, at Tyumen. From him we learned, that the hunting of the beaver is a profitable occupation at Surgut; but that the lower strata of the earth are not frozen there the whole year round, though such may occur at Beresov, in 63° 57′. The fishers and hunters from the north are obliged to procure all the vegetable productions they consume from Tyumen.

This city is, to this day, called by the Tatars Chingistora*, the city of Chingis, the name it was known by when some followers of the Mongolian Khan, Chingis, fixed their residence on the Tura. In 1571, Yermak, with 500 of his followers, marched against the Tatar city of Isker, eastward of this place, near where Tobolsk now stands, as it had been chosen by the Khan Kuchum for his capital, instead of Chingistora. Yermak's death saved the tribes upon the Tura from the conqueror of Isker; but in 1586, the Russians again appeared in the neighbourhood. Isker (called Sibir by the Russians), was now converted into a garrison merely, while the first Russian city in Asia was founded on the site of Chingistora. The origin of the name Tyumen is equally unknown with that of Sibir, both of which were then imposed by the Russians.

Though the early settlers had lost their cattle and horses by disease, and though they were frequently harassed by the successors of Kuchum, who had joined themselves with the independent Kalmuks on the Upper Irtuish and Ishim, they still found themselves

* From *tora*, the Tatar for a fortress.

sufficiently compensated for all their suffering by the fertility of the soil. The monks, who settled there in 1616, never received any of that support which fell to the share of their brethren in Europe. The produce of their labour, however, was soon augmented by gifts of land ready prepared for seed by the inhabitants; till, in a few years, their monastery became the richest in all Siberia. The fertility of the land at the mouth of the Nitsa has been already remarked (see p. 253.); but it is a general observation, not only in the districts of Tyumen, but all through Western Siberia, that the most abundant crops of corn are always gathered from lands that have once been under forests.

October 5.—For the 105 versts between Tyumen and Yujakova we found the forests thinned, and that the plough had been busy in the open fields round the villages. The inhabitants of this vicinity are mostly descendants of Russians, who settled here soon after the conquest, and are often distinguished from the later compulsory settlers by the appellation of old inhabitants (starozhiltsi). Even here, some direct acquaintance with the kingdoms of Europe is kept up by the conscripts, who are sometimes drawn, not only from Tobolsk, but from the most remote parts of Siberia. In the comfortable village of Pokrov (seventy-nine versts from Tyumen) we encountered a farmer, who had been with the Russian army in Prussia and France, and was now returned to enjoy his renown in his native place. Soldiers are not discharged till after twenty-eight years' service; but those who do survive this term, find themselves indemnified in some measure for early loss of friends by the consideration in which they are held by their simple countrymen. They become objects of pride to their own families, and of respect everywhere. They are conceded the place of honour under the

holy image (pod obrazom), and are always addressed by the title of master soldier (gospodin slujivui*).

We saw great numbers of geese and swans, which were taking their flight towards the lakes in the southern part of the government of Tobolsk (lat. 55° and 56°), where they pass the latter end of autumn. Their winter retreat is in the Lake of Aral, or the Caspian Sea; but they are attracted, in going and returning, by the more luxuriant vegetation of the lakes in the steppes, where they are caught, and thus become a great source of profit to the surrounding tribes. Their importance, in the circles of Kurgan and Ishim, is recognised by the frequent occurrence of villages distinguished only by the prefix to their names, of lebyajoeya, or gusina derevnya†, *i. e.* Swanthorp or Goosethorp.

In Yujakova, where we stopped for the night, we were present at a vecherinka (see p. 272.), held on the Sunday evening. The singers (girls) were huddled together upon wooden benches, fixed to the walls of a badly lighted apartment; while the elderly men were mounted upon their palàta, with their heads stretched out over its side.

It was not long before we perceived that our presence was an annoyance to the company; but it was not till some of the elder visitors began to declare their determination aloud, of retiring to some other place of meeting to escape *defilement*, that we became sensible it was our smoking that had produced the commotion. We contrived, however, to soothe the irritation of those fanatical rascolniks by proper explanations; and a peace-offering of brandy completely restored the good humour of the party. Some young

* Gospodin is equivalent to the French Monsieur, or Seigneur; and slujivui means, literally, one who has served (in the army).

† Derevnya is the Russian for a village.

men now came in, and dancing began. The dance performed is known in European Russia as the khorovod, the name being derived from the Greek χορὸς (choros), and the Russian vodit, to lead, and properly meaning the persons, — χορηγοὶ (choragi) of the Greeks, — though now applied to their performance. The girls first began, with their hands joined, forming a circle, and swayed themselves from left to right, and again from right to left, keeping time with the varying measure of the chaunt (protyajnie pesni), in which all, spectators as well as dancers, joined; till they broke off, in pairs, into a livelier movement, in which the pantomime was much more appropriate to the words of the accompaniment. The standing part of the chorus then formed a circle round the partners in the middle, who had begun the performance of the trepak*, known in Europe as the Kosak dance. One of these compositions I had never heard in European Russia, though it was perfectly illustrative of the popular taste. An izvoshchik (driver, or postillion, *Russ.*) was introduced next, describing, both by words and gesture, how many journeys he had made to town, and what presents he had brought to propitiate his mistress. The dancer here represents how he brought his offerings on a silver dish, placing it in her hands, and then retiring; and how the disdainful fair one not only rejects them all, but dashes them down at the feet of her suitor. Shoes, rings, ribbons, and various other articles of female apparel, are enumerated by the choir, and are actually symbolised by a scarf, which the man lays on the shoulders of the girl, but which she tears off, and throws on the ground. After each act, the singers bespeak the sympathy of all tender-hearted people (dobruich lyudei) for the unfortunate lover; till, after another

* Possibly from *trepetat*, to quiver, *Russ.*

and more successful journey, the *silken whip* is accepted, as a pledge of future union, and the implied assent is ratified by a kiss. The Balalaika, which was often played by a young man, during the dance, supplied an accompaniment to the chaunt.

After making a magnetic observation, when midnight was past, I found these simple festivities still at their height, and still conducted with the strictest decorum.

Long exposure to the damp night air rendered a night's repose upon the palàta of a comfortable peasant's house far from disagreeable. In order to have the full benefit of the dry heat, the country people take off their upper clothing, and spread it under them. Where there is both izbà and gornitsa in the house, the first is understood to mean a sort of chamber, furnished in the old fashion, with a sleeping-place, or palàta; but the latter is without this, and only used during the day. The pegs of wood, fixed perpendicularly one above the other, which serve to conduct to those warm and elevated couches, are always to be found in the angle formed by the great stove and the wall of the chamber.

October 6. — We travelled 100 versts from Yujakova to the village and stage of Kutárbitka. Among the drivers of our carriages we recognised the nimblest dancer of yesterday's festival. Travelling on the road also seems to them rather pleasure than business, and partly with ever-varying, apposite addresses to the horses separately, always in rhyme, partly with songs of considerable length, they accompanied the alternate bounding of the rattling carriage. Words serve the Russian Yamshchik instead of the whip, which, in travelling, is never used. A mare he calls "good woman" (sudáruina); a tired horse, he addresses as starík, or "old fellow;" collectively they are called "little doves" (golubkí); and then, one

after another, they are separately accosted with every endearing epithet; they are exhorted to be "wide awake," not to flag on the road which constantly grows shorter, but to bound without delay from hill to hill.

We rolled rapidly over the still remaining portion of the fertile flats of the Tura, as far as the bed of the Tobol, where it flows northwards, twenty versts from Yujakóva. Its further or right bank alone is high and steep, and on the declivity was to be seen again the fine sedimentary earth already observed at Kamuishlov and Tyumen. Minute particles of black magnetic iron seem here to indicate more positively the Uralian talc formation, as the original starting point of this alluvium.

Tatars occupy the villages which now follow; they furnish horses, too, for the post. Their wooden huts are wretched enough; yet one of the men who drove us, boasted with no little self-complacency, of the ancient nobility of his family. On the latter half of the way, we came to a wood in which the Siberian stone pine (P. cembra) predominated. Hitherto the country was quite destitute of wood, and laid out for tillage. Close to the Tatar log-huts we saw always an ample area enclosed with a hedge, and into which the draft cattle were turned loose; and the drivers now showed their animation, as they were wont to do in the business of yoking, by cries of "make haste to catch the horses."

October 7. — The two stages from Kutárbitka to Tobolsk, fifty-five versts, were performed without a stoppage, in six hours. The road, going over a perfectly level tract, presented no difficulties, and yet the ground of this tract, liable to be softened by the floods or rains in the early summer, has a very bad reputation. Even in the beginning of August, Kutárbitka is said to be surrounded by an impassable slough.

Later information, respecting the extremely regular course of the weather in this region, agrees completely with what is here stated, and with our own observations, for on an average of ten years, there were 16·4 days of rain between the 1st of July and the 1st of August, while only eight take place from the 7th of September to the present date.

Arable land, nearly destitute of wood, extended around us as far as the Russian village of Karáchina, twenty-six vèrsts from Tobolsk; there pines and firs together (P. sylvestris and P. abies) began to form a wood. Within eight versts of the town, however, the view opens; one beholds with surprise, a steep and very considerable rampart of hills bounding the horizon from north to north-east, and on the declivity, at the top, a long row of lofty and white buildings, above which rise the five pointed towers of more distant monasteries and churches. Truly these palaces of Tobolsk tower in all the pride of dominion over the plains encircling them below. And the impression which the place makes becomes stronger, when it is perceived that it is round the promontory or angular projection of the hills here formed, that the Irtuish, turning from its western course, winds northwards to the ocean.

Before we yet reached the left bank from the broadest and most southern arm of the Irtuish, we saw on the stems of the fine willows traces of inundation to a height of two feet. Although the floods in this river attain their greatest height about the middle of June, yet it was manifest that the overflow which we now recognised, had taken place while the ice was on the river, for the hard floating flakes of ice alone could have cut the bark of the trees so deep and so regularly in the same plane.

CHAP. XIV.

PLAN OF A JOURNEY DOWN THE OBI.— SCIENTIFIC OBSERVATIONS.— RESULTS OBTAINED BY BORING. — PUBLIC BUILDINGS OF TOBOLSK. — STYLE OF THE PRIVATE HOUSES. — NATURAL ORIGIN OF LOCAL HABITS.— OFFICERS IN SIBERIA.— SIBERIA PRACTICALLY FREE.— GERMANS IN TOBOLSK. — ASTRONOMICAL OBSERVATIONS. — THE MARKET.—CHEAP FURS.—PROMUISL.— FOWLING NEAR TOBOLSK.—ABUNDANCE AND VARIETY FOR THE TABLE.—ELEVATION OF THE GROUND. — ITS TEMPERATURE. — CHAPPE'S OBSERVATORY. — DIFFERENCE BETWEEN THE IRTUISH AND OBI.

About two in the afternoon we crossed the chief arm of the river by a ferry; the water had a deep yellow colour from the fine earth of its bed which it disturbs, yet broke in white foam on the banks, and on the sides of the boat. In spite of gloomy and disagreeable weather, the Irtuish appeared the finest of all the rivers hitherto seen, and the sight of it gave new life to the wish to follow its mighty waters to the sea, before winter should completely enchain them. From the ferry station one can survey the principal branch as far as the mouth of the Tobol, which is not far off, but lower down; the northerly course of the united streams is indicated only by the masts projecting above the banks.

Proceeding along a log road, we ascended but little as far as the first houses of the lower town; and now, the broad river flat being crossed, it is perceived that a chasm or ravine, in the Chuvashian promontory, as it is called, leads up to the streets above.

Our entry into the town was rendered still more memorable by a heavy fall of snow. It is probable that this was not only the first snow storm that we met with, but the first of the season here also, for our drivers seemed to take much pleasure in the

beautiful flakes, which they, in their usual sportive manner, denominated "white flies."

There are no such things as inns at Tobolsk, but strangers must either appeal to old bonds of hospitality, or else by means of the chief civil functionary, or police-master, as he is called, they must make some new connection of that kind. In both cases, the term pogostity, to live as guest, is indifferently and with equal right applied, for the most needy Russian host, though he may indeed expect some remuneration, would yet be ashamed to demand it.

We were received in the upper story of a well-built wooden house in the lower town, near the church of Christ's nativity (rójdestvo Christóvoe). Towards the street there was no opening but the windows, but the interior of the dwelling was reached from a court-yard, fenced round, and by a wooden staircase attached to the inner wall of the house. An open space beyond the yard could be recognised as a garden only by the way in which the earth was formed into beds. Of arborescent plants there are here absolutely none, but even of humble annuals, every vestige was already quite effaced from the ground.

In Tobolsk was confirmed what our previous information had taught us to regard as not unlikely. Our advance eastwards was put a stop to by the character of the weather, which seemed to the experienced natives of this place to be announced by the firstlings of the "white flies." For in truth, universally as it is admitted that the coldest part of the year is the most favourable for travelling in Siberia, yet, at the same time, all agree as to the difficulties which obstruct the movements of any kind of carriage, so long as the struggle lasts between summer and winter. On account of the influence thus exercised on human intercourse, the Russians here habitually name this period of transition, as well as the

similar period at the close of winter, the *vremena raspútya*, that is, literally, "the time of the unroading" (spoiling of the roads); and they have even formed the verb *raspûtitsya*, to be unroaded. It is the snow without continual frost, which in autumn so much obstructs wheel-carriages, while at the same time it does not allow the use of the sledge, and this natural obstruction is too powerful to be overcome by the stoical endurance of the *Kak ni bud* (see p. 89.). Unless compelled to move forward by the most urgent interests, the most experienced Siberian travellers, the Russian merchants, are accustomed to await, at some convenient resting place, the hardening of the winter road.

From the very beginning of my journey I had looked forward with much partiality to an excursion, separated from the expedition, from Tobolsk to the mouth of the Obi; and this wish was rendered more ardent by the observations made and the information obtained here. The views which we had formed at Yekaterinburg, respecting our magnetical observations, were now fully corroborated; and it became evident that at every step we advanced eastwards, the intensity of the magnetic force continually increased, so that we found it at Tobolsk to be even greater than Sabine had observed it on the north coast of Spitzbergen. As we had now discovered new points comparatively far to the south of the same isodynamic lines, parts of which lie between Spitzbergen and the North cape, it was desirable that a journey along the Obi should determine more closely what course those lines take in connecting themselves with their branches curving south-eastwards.

There was also the alluring prospect of enjoying, on the northern part of the Obi, the first undisturbed intercourse with the aboriginal possessors of the land, where they are little changed by foreign influence.

Scattered pieces of intelligence which we had obtained at Bogoslovsk, from the reports of Voguls respecting the habitations of the Ostyaks and Samoyedes, received many accessions during the first days of our residence in Tobolsk; and the inducement grew stronger, to see with one's own eyes the attractive scenes, the sketches of which were so frequently presented.

I was desirous, at first, to complete at once the journey to Obdorsk by water, so as to be able to return to active life at the beginning of winter, which now threatened to arrest the movements of travellers, and also to be able to join MM. Hansteen and Due again in Tobolsk, so as to continue the journey in company with them. But the opinions of the inhabitants of Tobolsk whom we consulted on the subject, were so much divided as to the practicability of a lengthened navigation at the present season, that the preparations for departure were frequently begun and as often broken off, until at last, on the 15th of October, a report spread that travelling on the ice had begun in the lower part of the river. Some particulars respecting the last navigations of the year will be related hereafter.

Through this change of circumstances we arrived at least at the satisfactory assurance that, by staying a little longer in Tobolsk, the essential conditions of an excursion to the north would be better established, for the winter, which, doubtless, gives to the polar regions of the earth the most pleasing of their varying aspects, would grow continually more pure. At the same time we had conceived more liking for the town and its vicinity, and accordingly many interesting labours were now undertaken, which required a longer residence. As to the climate of the place, very satisfactory results were obtained by working the observations of temperature and the winds, made

by Dr. Albert in Tobolsk for fifteen years, with true German perseverance. We became doubly desirous, therefore, of obtaining, during our stay, the elements which were still wanting for the meteorological monography, such as the connection between the direction of the wind and the atmospheric pressure, as well as a direct determination of the temperature of the ground by boring. The periodical variations of the magnetic force, both as to intensity and direction, were observed here, as at every other place where we stayed for any time. I recollected also, that M. Bessel, who perfected and presides over the astronomy of our age, expressed some doubt respecting the geographical position of Tobolsk, where Chappe D'Auteroche observed in 1761 the transit of Venus. It struck me that, perhaps, the determination of this point, carefully made anew, might contribute towards fixing with more certainty the unit of measure of our system, the distance of the sun from the earth.

Some trials of boring which we made during the first days of our stay here, in the garden of our dwelling near the middle of the lower town, showed, at first, a black, unctuous, peat-like earth which, for six feet down, was only moist, while water stagnated lower down in the stratum to the depth of sixteen feet, and collected immediately in the holes. But, below the depth of sixteen feet begins again the dry, fine earth of Tyumen (see p. 308.), which, on the top of the hills of Tobolsk, occupies the surface. Thus it appears that the low flat, enclosed between the bend of the river and the steep side of the hills, underwent but a gradual change from bog to habitable ground. Creeks and canals still stretch inwards from the Irtuish, where it flows northwards, the only part of the river immediately bordered by the lower streets. The most considerable of these creeks lies close to the foot of the hill. Its mouth is sufficiently navigable

to serve as a harbour for the river-craft. A bridge on piles near the middle of the lower town, leads across it to the ravine ascending the Chuvashian promontory; but further east, it is lost in fens, from which, during the floods, a second drain, also above the landing-place of the ferry, extends to the Irtuish.

The Bazaar, with ample out-buildings and surrounded by a market-place, stands on the left bank of the harbour, between it and the great river. In the market-place are the council-house and some other public offices. But, further south up the river, the best situations on the Irtuish are occupied by the most important of the public buildings, the wooden houses of sailors and fishermen, however, being mingled with them, while in the middle of the town no one would suspect the vicinity of the water. In the grand row along the river are the houses and yards of the post-office, erected on a colossal scale proportioned to the immense extent of that circle of communication, the centre of which is here; then, after some wooden buildings, follow the walls of a convent destroyed by fire, portions of which have been repaired and converted into an hospital and poor-house. After this comes the house of the governor-general of Siberia, the grand façades of which call to mind the tasteful simplicity which characterises the modern architecture of European Russia. A long row of cannon in good condition, which point towards the open market-place on the land side, have hitherto served only for ornament. Yet in Tobolsk, as the centre of Western Siberia, a corps of artillery, which is distributed along the frontiers, has its head quarters; and they seem more than sufficient for the protection of the country so long as the plan is to maintain the southern frontiers, and not to extend them.

Several broad roads, with log-ways in the middle

and on the sides, lead from the river eastwards, and are crossed at right angles by similar roads running parallel with the stream. Churches of stone and little chapels stand generally at the cross-ways, where markets are often held in the open spaces. In this part of the town are to be seen only wooden houses; but there is something very striking in the difference, even externally, between the comfortable dwellings and the subordinate buildings, which, with the yard and wooden fence encircling all, constitute the homestead. A more intimate acquaintance with the inhabitants of Tobolsk taught us to recognise, in this seclusion, ampleness of plan and independence of establishment, an essential feature in their mode of life. Here the great confederation of a town must, of necessity, fall asunder into small and independent circles. Although no citizen of Tobolsk possesses serfs, yet nobody has any difficulty in getting domestics fully as much subservient to him, in fact, who, seeing that their own efforts and possessions are not sufficient for their support in the season of want, are ready to attach themselves to a comfortable household, and to purchase by their services a refuge from care and suffering. They are, for the most part, solitary Russian exiles, or Kirgis, driven here by the vicissitudes of fortune, who attach themselves as servants to families in Tobolsk. They often marry, and yet remain cheerfully in the house of the master whom they have chosen.

It may have been the persuasion, which here rapidly acquires strength, that the local peculiarities of social life are strictly natural, and founded on necessity arising out of the climate, which rendered every acquaintance with a new circle of the inhabitants of Tobolsk a source of the most tranquillising and soothing impressions. And, indeed, now, as winter was beginning, we felt, for the first time in Russia,

almost a wish to remain still. It is agreeable to observe how much to the purpose are the preparations made for the coming contest with the elements; how, surrounded with an ample stock of provisions, and between the walls of his warm house, every one seems certain beforehand of victory; and there seems nothing left for him to wish, unless that the snow would cut off his home more absolutely from the rest of the world, and that wintry storms, beating in vain against his secure bulwarks, would afford him the pleasure of a strong contrast. The physical pleasure which the bears, and still more the gregarious burrowing animals, may be supposed to feel when the snow first covers up their retreats, may perhaps be united with the nobler charms of solitude, to give the town-life of Tobolsk its peculiar agreeable character.

Here, one clearly discerns, for the first time, in the Russians, a singular mixture of indolent shunning of labour with the most energetic efforts of mind and body to satisfy the chief necessities. Acuteness and vigour of mind are exerted, in order that he who makes the effort may be able to return as soon as possible to a state of assured rest, and the limit of care and forethought is, at the utmost, a year. As to the continual perfecting of the physical and intellectual condition of the individual, it is never thought of, since every new period brings back the same cares which filled the preceding one, and exercises and develops the old energies which were just sufficient for the purpose. The chief attention of the inhabitants of Tobolsk is devoted to sustenance and to warmth: it must not, therefore, be thought extraordinary if, in a description of that town, the subjects of food and clothing be much enlarged on, as on the choice and mode of procuring these depends many a peculiarity of the land and its inhabitants.

Our occupations, during the first few days after

our arrival, kept us chiefly in the lower part of Tobolsk, and some time elapsed before pressing invitations induced us to ascend to the older streets on the hills, the distinguishing character of which shall be related hereafter.

We found in the Governor-general, Velyaminov, from the first moment of our acquaintance with him, not only a friendly inclination to favour every detail of our plans, but from social intercourse with him also, we derived a rich store of various information. He had been very recently sent from the happy valleys of Georgia, on the fertile southern slopes of Caucasus, to the plains of Tobolsk and the cold bank of the Irtuish; and at both points of the empire, in themselves equally interesting, an innate spirit of inquiry, as well as a sense of official duty, impelled him to penetrate into the peculiarities of the land and its inhabitants. Of the other Government officers also, a great many had but recently arrived from the southern provinces, and they often talked of the fiery Georgian wines, which have been very lately found capable, with better management, of bearing the carriage to Northern Russia, of the famed steel arms of that country, as well as of the combats between the spirited, inflexible Circassians, and the smart, dexterous Don Kosaks; and they made comparisons between Caucasus and the country round Tobolsk, where Russian hardihood had to contend with stern nature and not with human passions; they touched, also, on the importance of the river navigation, and of the fisheries of the Irtuish; of the trade with the good-natured inhabitants of the north,—the Ostyaks, —and of the very scanty information possessed in Tobolsk, respecting the manners and modes of thinking of those peaceable Ichthyophagi. They expressed their hopes that the limits of agriculture, northwards of Tobolsk, would be much extended, and looked for-

ward to the return of a surveyor, who had gone by water the preceding week to Beresov to survey and lay out for the Russian traders settled there a piece of ground for tillage.

The ferry of the Irtuish is big with fate for the numerous exiles who annually cross it, for it is this passage which is first considered as the symbol of political death; but for others, also, it enjoys a much bruited importance, in consequence of the law which grants to every one who offers himself for public service in Siberia Proper, a step in promotion on crossing the Irtuish. Hence the passion of the *Chinoliúbie*, or love of rank, drives a crowd of officers annually from the capitals of the mother country to Tobolsk, and thence further into the interior of Siberia. For the enjoyment of the promised advantage, after their return home also, there is required only a three years' residence in their solitary abodes; and, as the temperament and early acquired bent of character of this class, rarely allow of their relishing the peculiar pleasures of Siberian life, they seldom protract their stay beyond the required time. The land in which they are employed in regulating internal relations, and in endeavouring to contribute to the public welfare, is regarded by them, merely as a soldier regards his winter quarters in war, or a traveller his temporary resting place.

For the proper management of affairs, therefore, an enlightened, earnest, and vigorous uprightness, such as characterises M. Velyamínov, would be obviously an indispensable requisite, if it were not that the influence of a troop of officials is here next to nothing; for in Tobolsk, so simple are the lives, and so few the wants of the permanent inhabitants, that the Government seldom has an opportunity of meddling with them. The business of the officers is confined to the collection of the Yasàk, or tribute of furs,

which is levied only on the aboriginal tribes; to the direction of the post, and other institutions of public utility. Here the class of Russians who wear uniform, appear in some measure to be only a kind of memorial of the mother-country; for the patriarchal forms of free republics still prevail, as well for reciprocal intercourse, as for the internal management of families. Every one gains something, either by drawing upon nature, or by trade, or, as is more commonly the case, by both together. We have often heard it said in Russia by well-informed men, that Catherine had once a particular fancy for the project of giving Siberia a constitution like that of the North American States. Such a thought could have resulted only from a thorough comprehension of the country and its inhabitants; and so naturally adapted is it to their condition, that to make Siberia a republic, little more would be requisite than to add the title to the present state of things.

A most important portion of the constant population of Tobolsk, and to us by far the most agreeable, is formed by families of German descent. They are numerous in the official class; and so decidedly does the influence of national temperament develop itself, that these always take pleasure in whatever characterises Siberia, and but rarely, and unwillingly, change their homes for European Russia. The pleasurable hours which we spent in these peaceful circles, constantly led us to speak of the total difference between the position of the Germans in St. Petersburg and those in Tobolsk. Here is no longer seen any trace of an effort to adhere to the customs of the mother country; on the contrary, the strangers follow, with prudent flexibility, the example of the people among whom they have settled, and, like these, exert all their strength only to bring their riches closer round them. It is not easy to distinguish

between the household of a genuine Siberian family, and that of a German, but the mode of living of the Russian officer differs widely from both, for he struggles hard against frugal simplicity; and during his short sojourn here, clings with increased fondness to whatever luxury he still retains.

It is only to the religious creed of their forefathers that the Germans have adhered steadfastly; and it would appear even, that the return to primæval simplicity of life, brought about by irresistible natural circumstances, has revived in them the piety also of the middle ages. It is, therefore, at first, the more surprising, that there does not exist here, as in the towns which we had already visited, any coolness or antipathy between the Russians and the Germans, although the former are as devotedly attached here as elsewhere to the Greek church. But under natural circumstances so stern, the material of life becomes so essential and engrossing, as to form a sufficient point of union for all who participate in the common cares. Besides, the people here — at least in the town — are much more accustomed than the bulk of the community in European Russia, to consider the earth as not being the exclusive property of the Sclavonians; because either they were the most active-minded men, or those who had learned most from the vicissitudes of fortune, who being banished into Siberia, founded the families which are now looked up to as the most ancient and respectable; besides, there were among them at an early period, a number of foreigners, whose posterity, though outwardly changed completely into Russians, yet having imbibed, unconsciously perhaps, their fathers' sentiments, are little disposed to nourish national antipathies. We were soon known among the people as the "new Germans;" and a report was spread that we had come to Tobolsk to look for Yermak's golden armour. Our boring operations at

different points of the town had probably given rise to this rumour.

With southern winds, several heavy falls of snow had taken place up to the 9th of October. Then the wind blew from the north for a few hours; and in the course of the three following days, the barometer continually rising, the wind shifted from N. W. to W., then to S. W., and so round again to the S. Heavy clouds now hung low, and rain continued during the 12th and 13th of October, till again the wind changed from S. to N., and then, at length, on the 14th of October, when it was from the W., and the barometer moderately high, the clouds for the first time dispersed. Currents of air from the E. were observed only temporarily and in gusts, just before the west wind set in.

It was on the 15th of October, therefore, immediately after sunset, that we first began to observe the stars, in order to determine the geographical position of the place. The yard behind our dwelling, close to the church Rojdestvo, where we had already completed our magnetic observations, was now also selected, in the first instance, for our geographical determinations, although we had little hope that we could, from this point, draw any conclusions respecting the observatory of Chappe, the site of which it was so desirable for astronomical purposes to ascertain. To make this out, we were not sparing of anxious inquiries; but no one whom we met with could give us any account of the matter. We were referred at last to a MS. chronicle of Tobolsk, the only one which escaped the fire that destroyed the lower town in 1787. A Russian citizen wrote this register, with the name of *lyetopis*, or Annals, proposing to characterise every year by at least one event of importance. The march through the town, of the crews under Beering's command, who were to navigate and

explore the sea of Okhotsk, was related very circumstantially, and even individual members of the expedition, who had spent some time in Tobolsk, were mentioned by name. Before all others is named the kind-hearted Steller, who was universally regarded in Siberia with the same love and respect that were felt towards him by the learned in Europe. As to the objects of our inquiry, however, we learned nothing; for, although some events of 1761 are recounted, in the last page of the part which is extant, yet there is not a word in it respecting the transit of Venus, or Chappe's arrival in Tobolsk. Whether it was that so incomprehensible an event as the establishment of an observatory, and the erection of mysterious instruments, made the author feel disgusted with the historian's task, or whether death interrupted his labours, remains undecided.

October 16—23. — In the spacious market-place before our dwelling, was to be seen every morning a numerous assemblage of the inhabitants of the adjoining country. There were Russian peasants, and, less frequently, Tatars, who supplied the town with the productions of the soil. The waggons, laden with hay and wood for fuel, were now the most numerous. At this time of the year, kitchen vegetables are rarely brought to market; and a good stock of fermented cabbage (sowerkrout) is to the townspeople indispensable. The pickling of vegetables and fruits does not seem to be very usual here; and it is only on feast-days and great occasions, or at the tables of the rich, that one sees, besides kale, a few other vegetables which are kept from the summer in cold cellars. The most esteemed of these is a very aromatic, yellow, conical root, measuring four or five inches in its greatest diameter. It is seldom that even beef is brought into the town at this season; but every one has either a sufficient stock of it already,

or else he buys it of the flesh-dealers in the Góstinoi dvor, or bazaar, who obtain by barter in summer from the inhabitants of the southern government, and especially from the Kirgis, whole herds of cattle, the flesh of which they store in ice cellars. Every household is well provided with corn for the preparation of Quas; and in a particular division of the bazaar, flour is the staple article of a constant trade.

Round the buildings of the Góstinoi dvor, and in the open air, a great variety of wares are constantly offered for sale to the passers by, at the lowest price, by the poorer towns-people. They are chiefly articles of dress of cheap materials, made by the women of the humbler classes, and sold singly as opportunity allows. Stomachers, lined with fur, and fur collars, are purchased here eagerly by the country people. Hare skins, though exceedingly cheap, are much esteemed for their warmth; but the summer skins, of as brown a colour as is usual in Germany, and which at this season were the prevailing kind, have little value, as the hair does not hold; at a later season the white and durable winter skins grow abundant. Generally speaking, the snow-white furs of the winter hare, and the stone-fox (Canis lagopus, pesèz, *Russ.*) appeared to be the especial favourites of women of the humble classes, and with these they always line and trim the neck and sleeves of the short jackets of light-blue Chinese cloth, which, under the names of tyelogréika and dushugréika, they wear over all.

Men, too, particularly Kosaks and old soldiers, are to be seen in the same place, employed in similar dealings; retailing sometimes raw materials, sometimes manufactured articles, which in the course of their travels they have picked up by barter with the aboriginal inhabitants. From these occasional dealers may be obtained, at a much cheaper rate than from the merchants of the Góstinoi dvor, the manifold

varieties of the reindeer-skin, together with complete suits of clothes made of them, in the Ostyak fashion; swan's down, also, and the blackish, glistening plumage of the Colymbus arcticus *Linnæus* (Cepphus arcticus *Pallas*), and of other water-birds, which the richer town's-people often use to cover their caps, as being at once waterproof and ornamental.

Here, as in the more eastern parts of northern Asia, among the free Siberian-Russians, instead of the system of contracting for services, usual in the mother country, recourse is had to an avocation quite as shifting, and as various. This business is very significantly denoted in Siberia, by the term *prómuisl*, a word hardly known in European Russia, which, exactly analogous in derivation to the Greek work προμήθεια, signifies every kind of inventive and active care for the future. With the exception of agriculture, whatever assures an individual a branch of business, whether it be hunting or fishing, or the digging for precious minerals, or trade with the native tribes, comes under this denomination. Even the first Russian adventurers took a pride, and with good reason, in the new-found appellation of Prómúishleniki, or discoverers, as they dispersed themselves, not without subtle intentions, through countries but little known to them, and occupied by aboriginal tribes who were their deadly enemies. Then they soon found either something profitable in the natural productions of the place, or employing all the arts of an engaging carriage, and the allurements of a trade at that time very confined, they at length won the confidence of the good-natured owners of the soil. They brought back with them not only rich presents, often contrary to all expectation, but it even sometimes happened that they induced their new acquaintances to bring every year to the Russians in their neighbourhood, a quantity of valuable furs, to

them an easy task. The talent of the fathers has descended on the sons, and to this day the expression "to find something out" (to discover some new art or resource) is the general watchword of all the men in Siberia, and, from its deep influence on their character, will be frequently referred to in the sequel of this narrative. In like manner the helplessness of a person wholly without ability, is expressed by saying that he is not capable of finding any thing out.

It would be far from correct to translate the term prómúishlenik by freebooter, for in these frequent and usual expeditions into the country, no force nor proceeding of a hostile character was ever had recourse to, nor is it ever done now; the unwearied and constant exercise of superior bodily strength is confined rather to the labours of industry; but in his intercourse with the natives, the prómúishlenik employs only the peaceful arts of the trader.

The men of Tobolsk engage with much heartiness in killing the wild-fowl, which is so numerous in the neighbourhood, that at this season partridges and heath-cock are ordinary food with all classes of the inhabitants. The large ptarmigan, also, becomes in the depth of winter extremely plentiful in the immediate vicinity of the town. But they, as well as the German pheasant (Tetrao tetrix), and the cock of the woods (T. urogallus), are brought at all seasons from the country of the Ostyaks further north. The universal enjoyment of these and various other kinds of food, which in Europe are reserved for the most part for the favourites of fortune (ἃ καὶ μάκαρες ποθέουσι), cannot fail to remind one of the opinion asserted by Paulus Jovius, who, already in the middle of the sixteenth century, speaking of what he had himself witnessed, maintained that the Russian people lived not so much in elaborate elegance as in the richest superfluity, for their tables were always sup-

plied, and at the most trifling cost, with kinds of food which none but the most luxurious and prodigal among us ever thought of procuring.* What he said then of Russia in reference to game, which in western Europe at that time appears to have been already the exclusive property of privileged grandees, as well as to the abundance of fine fish in the rivers, is a fair picture of the ordinary resources of Tobolsk at the present day.

Swan's flesh is rarely eaten in Tobolsk, unless salted, and on that account it is but little esteemed. It is obtained in this state from the Russian settlers along the Irtuish and Obi, who, in autumn, stretch nets on the side of the stream, in places where they have cleared away the wood, and then, rowing down in foggy weather, they drive the swans and flocks of other water-fowl into these snares. They throw the enormous stock of game thus procured into pits carelessly dug near the banks of the river, and have recourse to it in time of want, not being over nice if it be somewhat tainted. A few who are more stirring and thrifty salt the palatable food, and carry it to the towns at some distance. In like manner, the eggs of several kinds of duck are sold in Tobolsk for a mere trifle, yet not in such abundance as totally to supplant domestic poultry; for the latter are taken great care of during the winter, and are often kept even in the warmed rooms of the house. For preserving the eggs of wild fowl, the people here want the effectual means which the Russians on the Eastern Sea derive from the whale fat.

At the feasts which our friends in Tobolsk gave on several occasions, either, as was generally the case, by way of religious celebrations, or else to commemorate

* Pauli Jovii de legat. Basilii magni Princip. Moscov., ad Clementem VII. Pontific. Max. liber, in Comment. rer. Moscov. p. 170.

some public or private event, the direct influence of the church upon the kitchen was very manifest; for, in order to represent the superstitious meat, or *piròg* (from *pir*, a festival), exactly according to the dietetic prescriptions generally accepted, the most curious variety of vegetable and animal ingredients were inclosed in dough, of different degrees of fineness. The correct and orthodox preparation of this chief viand seemed to satisfy the consciences of the faithful, and they did not stickle much about the other dishes, of which, indeed, they ate less. Along with the usual berry wines, good European wines, also, are generally to be had here, of which the stronger, and consequently the most easily preserved from the frost, are brought here on sledges, and so undergo much less enhancement of price than other liquors liable to congelation.

The resources for the table furnished by the trade with Southern Asia, are, from long usage, become so indispensable, that they are looked upon as if they were the produce of the country. The most important of all is tea, — a comfort which no townsman is willing to relinquish. The *Bányi*, or vapour baths, themselves are not more sure of being included in the house furniture, of even the most frugal, than the pewter tea-pots, known in Russia by the name of Samavàr, or self-boilers. Perhaps an instinctive sense of the beneficial character of whatever tends in this climate to promote perspiration, prompts to both kinds of indulgence; but, while the energetic vapour baths are here used but once a week, tea is taken at least twice a day; and in summer, as well as winter, the family assemble at certain hours for that purpose. Among the middle classes, the family and servants take tea together. Otherwise, there is sure to be a samavàr in the izba, or servants' apartment. In the evenings, and on festive occasions, conserves of

various kinds are served with the tea, after the Chinese fashion. In the first place, there is the nut of the stone pine or Cembro nut, a Siberian production; then a great number of fruits from Southern Russia in Europe, prepared in Chinese sugar (ledinez, ice-like, from lièd, ice), and which are carried here, under the name of Varénia (confection), in the course of a very active and constant trade. The fruits of Bokhara (see p. 145.), as, for example, the Uruk, are here dressed as vegetables.

The elevation of the ground in the upper town, on the hills, we determined, by means of our barometer, to be 215 feet above our dwelling, or 240 feet above the Irtuish. The way up leads in a deep cutting between two high walls of earth, and is closed above by a stone gateway with double gates. This work is said to have been executed by the Swedish prisoners of war, whose fate was decided at the battle of Pultava.

Lateral paths along the slope of the hill conduct to deeply excavated and vaulted caverns, which are now closed with iron gratings, and are used by the merchants as storehouses. It is not unlikely that many of them were originally the dwellings of monks and hermits. Above, on the edge of the hill, we had now a nearer view of the ancient and most stately of the stone buildings which, from a distance, had given the hill so conspicuous an appearance.

On the right, as we advance, is seen the abode of the ecclesiastical ruler; for adjacent to the great cathedral church, with its five roundish cupolas and a belfry full as high as the hills of Tobolsk, and to several smaller convent churches, lies the wide area or court which surrounds the palace of the Archierăi, or Archbishop of the western half of Siberia. The roundish windowed domes of the churches seem to indicate Byzantine models. The chief

tower always rises on the eastern side of the church; and it would seem as if the scanty means at the architect's disposal had conduced to purity of taste, for those gaudy decorations of the cupolas which make the towers of Moscow look like imitations of Mongolian buildings, are never seen here.

In the court of the archbishop's palace a well is sunk to the level of the Irtuish; and the walls inclosing the elevated part of the town show that there was a time when the inhabitants were intent on securing themselves against the enemies who lurked around. The old arsenal of Tobolsk lies between the most eastern church and the nearest adjacent part of the wall.

On the left of the gateway formerly stood the house of the governor, which was destroyed by fire. These buildings of Tobolsk are all of brick; for the harder component parts of the earth's crust are here utterly unknown; no stones or pebbles from the mountains having reached these plains, either by the rivers or by any other way.

Several streets of handsome wooden houses run northwards, towards a trench and a high wall of earth, which, extending both on the right and the left, terminates on the one side at the stone walls of the town, and on the other at the steep slope of the hill. Churchyards extend from the interior of the town as far as the latter limit, towards boundless wastes; and in the furthest north-eastern angle lies the German burial ground, ornamented by a few trees and shrubs.

We often walked northwards beyond the mound, on the edge of the declivity to the Irtuish, which is deeply furrowed by cross ravines. In these hollows some leafy bushes seek shelter from the wind; they but rarely reach the exposed upper surface, which is decked, however, by a number of annual plants pre-

ferring dry ground. They were at this time all dead, killed by causes of such sudden operation, that their forms still remained perfect. These remnants of vegetation afford an ample store of [redacted]ent to the larger kinds of game. Those sh[redacted] places that are well covered with plants, and which favour the growth of bushes, are called by the Russians *roshchi* (or places grown upon, from *rostity*, to grow). The water oozing out at the surface of these slopes, perhaps helps to promote the arborescent vegetation; and it is a place of this sort in the plain, which, under the name of Máryin shchel (or Mary's glen), serves in summer as a rendezvous for the holiday folk of Tobolsk, particularly because the water which there issues forth, offers an advantage to tea-parties.

Below the town, also, at the foot of the steep hill, the mighty waters of the Irtuish are constantly of a dark yellow colour, and broadly distinguished from the blackish water of the Tobol; which, visibly separate, even below the junction of the two rivers, forms a stripe towards the left bank of the great stream. Single fishing-boats were to be seen sailing with a strong wind down the river.

The first hole which we bored, in order to determine the temperature of the ground at Tobolsk, near our residence in the lower town, had led us, as already related, through a soil filled with water; and even the last portion of the vertical opening, which was in itself dry, became soon filled with a slimy mud from above. Nevertheless, screwing the thermometer on the end of the auger, enclosed in a hollow iron cylinder, and packed round with substances the least capable of conducting heat, we forced it down through the boggy soil, to the deepest point of the hole. About noon, after having remained some time in the hole, the instrument being drawn out quickly, showed a temperature of + 2° R., that of the air being

+ 9°·5 R., and, excepting as to the disturbing influence which may have been exercised by the intruding water, this experiment seems entitled to the fullest confidence. But we had to rejoice in the complete success of a second trial; for we bored in the perfectly dry soil on the hill, near where the fire had been, to the depth of 30·5 feet, and when, after letting the apparatus stand for five hours, we drew it up rapidly, we saw it quickly covered with aqueous vapour (the outer air having a temperature of 8° R.), and the thermometer remained for a long time unchanged at 1°·8 R.

The engineers of the roads who reside in Tobolsk, aided us most cheerfully in making these experiments, and stated many facts from their own experience, confirmatory of the results which we had obtained respecting the local temperature of the ground. Here, where a stratum of earth, under ordinary circumstances as to the surface, and from 20 to 30 feet deep, has a temperature of only 1°·8 R., the localities in which frozen ground occurs at a less depth, protected by strata refusing to conduct heat, are naturally much more numerous than at those points further west, of which we have already related something similar (see p. 258.). Even in the middle of summer, ice is often found here, in digging foundations for buildings, or drains for the roads, or raising the logs which form the roads. That such phenomena are much rarer at the end of autumn is here attributed to the operation of the summer rains and not to the increased temperature of the air, which penetrates the ground much more slowly.

At the beginning of the week just passed over, the temperature at noon was from 9° to 10° R., a height obviously due to the clear skies which followed the south winds that brought the rain. The next return of cold seemed more decisive. On the evening of the

19th October, after having observed successfully the passages of several stars with the transit instrument, we saw striped clouds (*cirrostrati*), suddenly formed at a great height, and a colourless ring appeared round the moon. Every thing indicated a change in the upper region of the atmosphere: in the night, the wooden ways in the street were covered with hoar-frost, and next day, there was a north-east wind with fog. At noon, too, the temperature of the air rose now no higher than + 3° R.

(*October* 24—31.) A religiously observed state holiday, which fell on the Sunday of this week, and excited a general commotion among those of the population who were imbued with European sentiments, turned out by a very singular accident to be of permanent importance to us. The last news of the taking of the Turkish fortress, Varna, and the birthday of the emperor's mother, were celebrated at the same time. The masses were performed by the high-priests in the head-church in the upper town, and the people received on their knees the benediction, which is rarely given so directly. They then assembled for the purpose of mutual congratulation, first in the archbishop's palace, and afterwards in their own houses; beginning, however, according to established procedure, with the houses of the principal officers. Among the inhabitants of Tobolsk, whom this great solemnity drew for a moment from retirement, was a Swedish artillery-officer, eighty years of age, Colonel Kremer, the first, and indeed the only, person who was able to give us any satisfactory information respecting the site of Chappe's observatory, for he himself had some years before superintended the taking down of the tottering building.

The next morning we proceeded with this venerable guide to the most northern part of the mound in the upper town, where there is a toll-bar (sastáva)

on the road to Beresov, and then eastward along the mound, to the north-easternmost angle of the German burial ground. On the level surface of the mound in this place, we found indubitable traces of the classic edifice. Grave-like trenches, dug on the site of the old walls, with fragments of the brick foundations lying in them, showed a square enclosure, in the middle of which a small quadrangular structure, of the same materials, could be recognised with certainty as the foundation on which stood the quadrant used by Chappe. In a few years the possibility of making this discovery would have been at an end, for no one could here discern the remains of an observatory, if they were not pointed out by a surviving witness of its existence. The following evening I spent some time in the German burial-ground, in order to determine, by observations of the stars, the geographical position of the interesting ruin, but was foiled by unfavourable weather.

Another important event of this week was the arrival from Beresov of M. Fraulov, the traveller whom we had been expecting. He had come back, too, the whole way by water. Nay, he thought that it was not yet too late to attempt descending the river; for in case of the ice setting in, the journey might be continued without one's own vehicle, in the dog-sledges of the Ostyaks. This is the plan followed by the last of the fish-dealers (ruibakí) who travel up from Beresov, and who usually complete half of the journey by water, and then cross with dogs to the nearest Russian settlement, where they hire larger sledges and stronger draught animals for their loads.

We saw on the Irtuish the vessel in which M. Fraulov had performed his voyage. It was a boat, such as those used here by the fishermen, and called Lodki, about thirty-five feet long, and fourteen wide, with a round bottom. The after-part alone had a

fixed deck; the rest being sheltered from the weather by strips of birch-bark, and with bast mats. The snow had now closed completely the several parts of this light roof. This boat having made its voyage, was offered for sale for fifteen roobles, and the boatmen, who were present, and who had been hired in the nearest places down the river from Tobolsk, advised me very urgently to seize this opportunity, and to begin the passage by water with them. But as the mean result of fifteen years' observations gave us to understand, that in all probability the river near Tobolsk would be completely frozen over on the 2d November, we concluded that nothing would be gained by embarking now.

The navigation to Beresov, and the objects it presented to notice, were now made the themes of our conversation. There is a broad difference between the beds of the Irtuish and the Obi, in the look and the nature of the water; for the Irtuish retains its dark-yellow colour below Tobolsk, and its muddy water is hardly drinkable; whereas the Obi, with a bottom of fine sand, is perfectly clear. Pebbles are not seen till below the junction of the two rivers. The chief characteristic of the landscape is the constant difference between the two banks, for the hills of Tobolsk continue without interruption, and of the same height, on the right of those descending the river, while the low tracts on the left have, during the floods, the appearance of immense lakes. Branches from the river then extend far into the land, and the inhabited places lie upon islands, in groves of poplars, alders, and willows. On the elevated bank are pine woods of remarkable beauty. None of the five kinds of pine which we mentioned when speaking of the Uralian forests are wanting, and the trunks are large enough for the masts of ships.

As to the capabilities of the soil, which has never

been exhausted by cropping, the Russians settled between Tobolsk and Beresov have sufficient proof of it, since the seed of bread-corn has yielded them forty-fold. At Beresov, travellers from Tobolsk, who are pretty much accustomed to such phenomena, frequently wonder at the rapid progress of vegetation in the spring. In June the days there are warm, and the gherkins and turnips grow with extraordinary speed, and without suffering from the cold winds which often blow quite suddenly from the north. These rude changes are so keenly felt that the inhabitants of Beresov, during the hottest part of their summer, never lay aside their fur clothing.

Without the aid of the wind a boat runs the 620 miles of river-way, from Tobolsk to Beresov, in 190 hours, nearly three and a quarter miles an hour; and, considering this speed, the facility of returning is doubly surprising. This is partly attributable to the north winds which prevail in summer and favour the navigation upwards, and partly to a remarkable peculiarity of the Irtuish and Obi; for, while the current runs with uniformity on the left and lower bank, there extends from every projecting hill (*Russ.* Múisi, *i. e.* promontory) on the other side, a counter current a long way up, in which the boatmen, on their return, always steer their course. It is probable that the projections of the hilly banks extend under water, and divide the bed of the stream into separate basins, in which are formed independent and counter movements.

CHAP. XV.

EASY NAVIGATION TO BERESOV. — FORMATION OF THE SNOW-WAY. — NO WHIPS IN THE LAND OF HORSES. — THE GOSTINI DVOR. — CHINESE GOODS. — BRICK-TEA. — YARKEND GOODS. — TRADE WITH BOKHARA AND THE SOUTH. — THE ROUTE TO TASHKEND. — THE RIVER CHUI. — TIGERS IN THE STEPPES. — LIMIT OF THE TAMARISC. — GREAT HEAT OF TASHKEND. — ITS PRODUCE AND INDUSTRY. — EXPORTS AND IMPORTS.

On the 30th October, the streets of Tobolsk began to look more cheerful, and new life seemed awakened in them, for a good snow-way had been formed, and there was now little danger of this agreeable state of things being disturbed in the vicinity of the town. Every one looked about him for a new, or a repaired sledge; and from these first excursions we satisfied ourselves as to the pleasures of a lengthened winter journey. The Russian horses appeared far more stately and more fiery under the sledges, and the motion was more agreeable, as it was not attended with any noise. It is remarkable, that in a country, where the love of horses is so predominant, the use of the cracking whip of Western Europe is quite unknown. I never remember to have seen it, or to have heard it named in Russia. The bells on the yokes of the horses are made use of, in summer and winter, only on the high-roads; they are appropriated to travelling carriages: in the town, the only noises heard, are the yelling cries of the drivers following one another.

The commercial hall, with its vicinity, was the constant scope of our sledge excursions; for it is a popular custom here to take the air under the covered ways of the shops, even without having any purchases

in view. In the construction of this Góstini dvor, the old custom of the mother country is still closely adhered to. The shops (lavki), standing under a common roof, surround a quadrangular court. In this are two similar buildings close to each other, one of which, without projecting porches, and the lower of the two, is intended for the trade in articles of food and other raw materials; while manufactured goods and foreign articles are kept in the larger building with covered porticoes. Both parts of the commercial hall of Tobolsk are of only one story, and built entirely of wood; and the larger division reminded me forcibly of the building in St. Petersburg for the same objects. In these buildings artificial lighting and heating are not practicable, or, at least, not customary, and consequently the shops are shut soon after sunset. But even in the daytime it is very dark in the deep vaults, and one constantly hears experienced buyers requesting the shopkeepers to carry their goods to the light, at the outer edge of the covered way. It is not long since some shops, like the toyshops in St. Petersburg, have been opened here in the houses of some of the wealthier merchants, because many of the articles imported are injured by the cold of the Góstini dvor.

We were much struck with the mixture in the commercial hall here, of Chinese with European manufactured articles; for in one shop may be often seen the two kinds thrown together in such confusion, that, without a good deal of experience, it is impossible to tell the quarter of the globe which produced each article. For most matters of daily use, both resources are equally available; but in such cases the Siberians invariably give the preference to the Chinese goods, partly on account of their cheapness, partly from ancient habit. Thus, for example, cotton fabrics of various colours are, under the name of Kitaika

(that is, Chinese cloth), the favourite dress of the people; and even in winter, for protecting their furs from the moisture, they find this Kitaika better than the woollen stuffs imported from the west. Still cheaper is another cotton fabric, generally blue, and known here by the Chinese name Dabu. Linen is received both from China and from Russia. The Siberian people use little of it from either quarter; but those who follow European customs, say that the linen thread of Archangel is much stronger than that from the south.

The Siberian women of the better classes constantly use two kinds of Chinese silken stuffs, the one called Fansa, white and of a light texture, the other Kanfa, very heavy and black. These valuable stuffs are also eagerly bought by European visitors, because they are seldom seen west of the Ural, and at a far higher price. Here one can already perceive, that if the Siberian traders, who occasionally approach the marts of these precious manufactures, had only a little acquaintance with the wants of Western Europe, they might turn to a good account this part of the Russian trade. In like manner, Chinese crape of singularly fine colours and texture, is always to be found in Tobolsk; but it is only just after their annual journeys that the merchants have it in any quantity, because this is one of the articles which, to use their own expression, they procure only to satisfy the curiosity of their customers. We saw here samples of many other productions of Chinese industry, which increase in quantity towards the east in the towns along the high road to Irkutsk.

It is from Kiakhta, as the single fountain, that these genuine Chinese productions issue, but they reach Tobolsk only by what may be designated as a kind of cryptogamic connection of the traders here, with those settled in Tara, Tomsk, and Krasnoyarsk.

None but the wealthier merchants or their prikashchiki travel as far as Irkutsk; but all employ in barter some of the furs prized by the Chinese, which they obtain in this neighbourhood by trade with the natives. The grand object of this journey is to obtain tea; and among the articles named above, the Kitaika also is found very profitable. After satisfying the demand at this place, the more valuable stock is sent forward to the market of Nijnei, together with the greater portion of the furs collected, for a small share and of an inferior description, are found sufficient for the Chinese trade.

In the shops in Tobolsk we saw the brick tea, as it is called (Kirpichnui Chai), eagerly called for by the Tatars. These brick-shaped masses of leaves of various kinds, pressed and cemented, or, as it were, felted together, also come from China; and they probably constitute one of the most important articles of the trade of Tobolsk, as the Turcoman tribes inhabiting the country, far prefer the drink prepared from it to tea properly so called. The rich merchants of Siberia alone maintain, by sledges, a direct communication between Kiakhta and Nijnei; but the petty trade carried on in small circles, which are connected, however, with one another, is essentially aided by the several portions of the system of river navigation, which extends uninterruptedly from Tobolsk, or even from Tyumen, to a point not above sixty miles from Kiakhta. The long voyages in summer on the rivers, give the traders an opportunity of bartering with the natives.

Essentially different from the goods of Kiakhta are some articles which one hears offered for sale in the commercial hall of Tobolsk, under the common name of *Yarkenskie* továri, goods of Yarken (Yarkend), the capital of the country named Little Bokharia, and

which is included in the dominions of China.* Among these, likewise, are cotton cloths, less elaborately worked than those which come through Kiakhta from the east of China; but yet welcome to the Siberians, because they are not only cheaper but more durable than the others. They are brought from a country where the cotton is much cheaper and much stronger, when spun, than that used in Pekin. In the same class of merchandise are to be reckoned some fabrics of mixed cotton and silk, and calicoes printed with large, coloured patterns (in Russian, vuiboika), and, besides, one of the most indispensable articles of dress of all Russian men in the government of Tobolsk, the kushak or sash used to keep the upper garment close round the hips, has the same distant origin; for the Yarken kushaks, which are made of the strongest cotton thread, blue and white, and are very handsome, cannot be matched for strength or cheapness by any thing brought from Europe.

At the same time, it is obviously owing to a loose way of speaking, and inaccurate extension of a phrase, that not only the articles above named, but a great many others, are entitled Yarken goods, for so they call the dried fruits already mentioned, respecting which it is quite certain that they are brought to Kasan from Bokharia, properly so called, and from the vicinity of the town of Bokhara; and what are here called Yarken calicoes (vuiboiki) are known to be printed in Bokhara, the white webs required being obtained partly from Yarken, partly from Tashkend and Kokan.†

This confusion in the use of names by the mer-

* Yarken in lat. 39° N. and long. 13° 3′ E. of the meridian of Tobolsk, is 1260 geographical miles distant from the latter place.

† Eversmann, Reise &c. (Journey from Orenburg to Bokhara. Berlin, 1823, p. 77.)

chants of Tobolsk, may be easily explained from the peculiar character of the trade by which they procure these goods. They annually receive the Yarken goods, as they are called, close to the southern boundary of the government of Tobolsk, in Petropavlovsk, on the Ishim, a place in the province of Omsk.* There, the most important business done consists in the purchase of immense droves of cattle, brought by the Kirgis; and the Siberian traders regard, as quite subordinate matters, the manufactures of the south brought directly to Petropavlovsk by caravans, or indirectly, and in greater quantity, by the Kirgis. The Tobolsk merchant pays with breadcorn, leather, and iron wares, not only for the cattle, but also for the manufactured goods; and the immense quantity of wheat carried to Petropavlovsk, shows that the trade there is chiefly on account of the Kirgis, for they can grow corn only on a few spots of their territory, which are irrigated artificially, whereas the southern Khanats produce rice, wheat, and barley in abundance, and have no need of the Russian cerealia. The people who accompany the caravans of camels, which pass over the Kirgis steppe to Petropavlovsk, are partly natives of Bokhara and Armenians settled in that place; partly Russian Tatars, who have free access not only into Bokhara, and the Khanats of Kokan and Tashkend, but also to Yarken, in Chinese or Little Bokharia.† The last-named parties collect

* The name of Omskaya Oblast (province of Omsk) is given to the tract, which, extending about 1200 versts from N.W. to S.E., and 350 from N.E. to S.W., extends beyond the military line formed by the Upper Irtuish. It is reckoned as belonging to Russia, although the wandering Kirgis, who are almost its only occupants, obey only their own sultans or chieftains, and are at peace or war with the Russians, according to circumstances.

† M. Eversmann, during his residence in Bokhara in 1821, met with many Siberian Tatars, both among those who carried Russian goods direct from Orenburg, and among those also who were engaged in the carrying trade from Kashkar (in Chinese Bokharia), and from Kokan to Bokhara.

Russian goods in Siberia, and with these they carry on barter at every inhabited place on their journey southwards, and back again; it is natural enough, therefore, that what they bring back should be of a very mixed origin.

At several other points, and under closely similar circumstances, the Russians maintain an intercourse with the countries to the south; for instance, west of Petropavlovsk, in the government of Orenburg, at Orenburg, Orsk, and Troitsk; on the other side, or eastward, from the same place, in Semipalatinsk, and the fortress of Bukhtarminsk, both which places belong to the lines of observation maintained against the Kirgis, by Kosak posts, in the government of Omsk along the Irtuish. These last-named places stand in the same relation to the government of Tomsk on the north, as Petropavlovsk does to that of Tobolsk. All these places have this in common, that they are separated from the southern Khanats by an extensive tract occupied by Kirgis and abounding in cattle. What we had learned in Kasan and Yekaterinburg respecting the trade carried on at Orenburg and Troitsk, now grew more interesting as we obtained new points of comparison.

The market of Orenburg has lost much of its original importance, since the Bokharians have been allowed to go direct to Nijnei Novgorod: now the place is constantly spoken of, chiefly because all the caravans from Bokhara pass through it on their way to Europe. A few Russian merchants, also, are settled there, who find opportunities, during the transferring of the goods, which are brought there on camels, to the waggons, to make some purchases for the supply of that province. But, besides, the Kirgis in the neighbourhood bring goods to Orenburg at all times of the year; not only cattle and horses, and the produce of their own industry, but also Bokharian mer-

chandise, obtained from the caravans by way of toll, and for which they were bound to give guidance and protection. In the autumn the Kirgis bring camels also to Orenburg for sale, because then the Bokharian caravans returning from the north, always want, for the carriage of the Russian goods, more of those animals than they brought with them on their first arrival.

The trade of Troitsk, also, has been sensibly affected by the removal of the limits formerly set to the journeys of the Asiatics northwards; and those trains of from 800 to 2000 loaded camels which used formerly to arrive three times a-year from Bokhara, are now rarely seen there. The town is situate on the right bank of the little river Ai, which there forms the boundary towards the steppe of the free Kirgis, who consider themselves as belonging to the middle horde. On the opposite side of the river stands a quadrangular wooden bazaar. The shops (lavki) are described as being dark, and, like stalls in a stable, ranged close together under one roof, and receiving light only from the doors. The whole is divided equally by two rows of counters running across in the middle, and one of these halves is again subdivided in like manner, so as to form two small quadrangles. The undivided half is named from the business for which it is reserved—the Kirgis barter-hall: the other two divisions are called respectively, the Bokharian and the Russian halls. Two narrow gates give access to the building, the one leading into the open steppe, the other to the river and town.

On the Kirgis side may be seen, in worn-out and ludicrously patched garments, the men riding upon camels and horses, the women on saddled cows; and the piercing cries of the camels, which are obliged to kneel down to be unloaded, are heard continually. The men are chiefly employed in selling the horses

which they bring here in immense droves, and which are kept partly in a paling within the hall, partly turned out to graze in the steppe. The women, seated on the ground, on the felt mats of their tents (kibitki), carry on the retail trade, and reckon their money. The Bokharians, Tatars, and Bashkirs are said to deal fairly and peaceably with their brethren in religion, the Kirgis, and to find amusement in their peculiar loquacity. The contrast between the grave and circumspect demeanour of the Bokharian, sitting in his dark booth on the woilok cushion, waiting quietly for customers, and the savage boisterousness of the Kirgis, is said to be very striking. These more civilised merchants are even there always clad in the rich long Khalat, while the greater number of the Kirgis go about in short jackets of horse skin with the hair on, or in ragged cloths, and with the most clownish air.

The purchase of cattle for food, and of horses, is of great importance to the Russians; and the pressing yearly demand for draught animals, of which we heard so much in the works in the Northern Ural, is constantly met by the Kirgis supplies brought to Troitsk. Brown felt mats (vóiloki) of the hair of camels, or of horned cattle, are also brought to Troitsk in great quantities by the Kirgis; and in every Siberian house, these are fully as important, especially in winter, as the bast mats imported from European Russia. The coarse carpets of sheep's wool made by the Kirgis find also a sale in Siberia. It has been remarked, that the Kirgis of what is called the middle horde, who now frequent the market at Troitsk, are richer in cattle and its produce than those of the little horde who live round Orenburg.

We have already spoken of the yarn spun at Troitsk from the downy hair of the dromedary; but, besides, some very thick fabrics of camel's hair are brought

there by the Bokharians, and used for making the enduring coats called Asyámi. In general it may be remarked, that all that is brought to Troitsk from southern Asia, whether directly by caravans, or circuitously through the Kirgis, resembles in all respects the merchandise received at Orenburg from Bokhara exclusively. As to articles from eastern China, only a few silver coins occasionally find their way to Troitsk.

The case is the same with Petropavlovsk and Semipalatinsk. The most important trade remaining to them is that in cattle, between the Siberians and Kirgis, and though the caravans arriving at those places never come direct from Bokhara, but from Tashkend and Kokan, and at times from Yarken out of Chinese Bokharia, nevertheless the merchandise which they bring always contains a large portion of goods from Bokhara, and the articles which in reality come from those Khanats differ from the productions of Great Bokharia much less than the goods of Kiakhta. The genuine productions of Mongolian industry come here but rarely and irregularly, and in these places the Siberians never buy either tea or kitaika. But the raw cotton also, which is brought from Bokhara to Orenburg in such large quantities, and the supply of which may possibly be much augmented to meet an increased demand, never reaches the more eastern seats of the trade with the Khanats, as in them purchases are made only for the wants of Siberia. Cattle for slaughter are alone brought to Petropavlovsk in quantities calculated for distant markets, for the tallow from the Kirgis sheep and cattle is melted in Tobolsk for export into European Russia, and hence it is that in summer beef is not very plentiful in that city, for the cattle are generally slaughtered where they are bought. From these places has extended to Tobolsk the use of an ar-

ticle of food which is particularly serviceable during summer travels. Mutton, finely minced, is rolled up into small balls and coated with flour paste, which keeps them untainted by air or moisture. Travellers carry these meat balls, which are called pilméni (perhaps from pility, to mince), in great bags, and dress them in the evening at the watch-fire, or season with them the Siberian peasant's kale soup.

The commercial intercourse here described, together with the Russian embassies undertaken for the purpose of enlarging and securing it, have not only furnished a vivid and complete picture of the remarkable steppes lying between Orenburg and Bokhara, as well as of the natural and political circumstances of Great Bokharia itself, but even the roads which lead through the territories of the Kirgis to the eastern Khanats of Tashkend and Kukanya, and the character of these countries, are all now perfectly well known in Siberia.*

From Kokan to the Russian frontiers, or on the opposite course, the route always goes through Tashkend. To the last-named capital there are two distinct roads from the Kirgis lines; the first of which, beginning at Petropavlovsk on the Ishm, unites with the other at the mountain of Ak-tau (560 miles S. 20° E. from Petropavlovsk), and thence it takes a south-western direction. The travellers first cross the upper Ishm (about 240 miles from Petropavlovsk), and reckon from that to the small river Nura 195 miles; from the Nura to the river Saruisu, 100 miles; and thence, passing by the mountain Ak-tau, to the

* Eversmann, Journey from Orenburg to Bokhara. The city of Bokhara lies in lat. 39° 1′ N. and long. 3° 1′ W. of Tobolsk. The city of Tashkend lies in lat. 41° 9′ N., and 4° 1′ E. of the meridian of Tobolsk. The Khanat of Kokan, as it is called in Europe, is invariably named Kukanya by the Siberian traders. The chief town of the same name is situate in lat. 40° 7′ N., and 3° 2′ E. of the meridian of Tobolsk, or 140 versts from Tashkend.

river Chui, 266 miles. If it be taken into consideration that the deviations from the straight line will probably vary at different times of the year, according as the caravans have recourse to the pools from the melted snows which collect at the feet of the mountains rising here and there abruptly from the steppes, these estimated distances will be found to accord sufficiently well with the latest Russian maps. It must be remarked, however, that the stream marked in the maps as an affluent of the Saruisu, and named the Yaryakshi, is considered by the caravan guides as the head of that river, and named by them accordingly.

In order to shorten the way through the country of the Kirgis, which, besides being inhospitable in itself, is always dreaded from the predatory character of its inhabitants, the Russian travellers prefer going E.S.E. from Tobolsk, within the Siberian frontier, and up the Irtuish, to the frontier post of Semiyarsk (that is, the seven hills), in lat. 50° 8′ N. From that point the road to the hills of Ak-tau is reckoned at only 430 miles, including a considerable circuit towards the east, for the purpose of getting good water and grass for the horses. The way from Semiyarsk to Ak-tau is nearly in the same direction as the remainder of the way to Tashkend, whereas the caravans going from Petropavlovsk first go south-eastwards, and then on a sudden turn to the south-west.

It appears from the accounts of Russian miners, who either accompanied caravans going to Tashkend, or wandered in these wilds for the purpose of exploring the country of the middle horde of the Kirgis, that a broad tract of mountain, with its stratified rocks generally striking to the E.S.E., extends from the meridian of Tobolsk, about 20 degrees further east. Under the first-mentioned of these meridians, this mountainous tract lies between the parallels of 53° 5′

and 49° 9′; while fifteen degrees east of Tobolsk, it is bounded by the parallels of 49° 5′ and 44° 5′. In the chain of hills on the northern side of these mountains are to be seen layers of the copper sandstone already spoken of; but while this rock always lies horizontally in the Ural, its strata are here much upheaved, and have an inclination of 40° to the north, a proof that these Kirgis mountain chains are of more recent origin than those of the Ural. Further to the south are found quartz-porphyry, jasper-breccias, and other quartzose rocks; then follows a limestone ridge of greater elevation, in the cross valleys of which are numerous caves filled with stalactites; mountains of clay slate, and finally granite in a narrow space, which includes the least rugged and conspicuous portions of the southern chain. The western continuation of the more elevated main chain is called by the Kirgis Ildigi Suirt, or, endless mountain; but towards the east, its different parts have different names, and among them is the Kurpetau, a mountain situate about 7° east of the meridian of Tobolsk.

Between the hills on the northern borders of this tract and the limestone formation, there is a wide extent of plains. Through these flow that portion of the Ishm which lies east of the meridian of Tobolsk; but the river Nura also, the lake Kurgaldjin, which receives the Nura, and the bed of the Kosakuch, which is filled with water only in the spring, and then unites the Nura to the upper Ishm, all stand in the same relation to the mountain system as the Ishm. A remarkable description is given of the appearances observable near the bed of the Tersekan, which flows from the more elevated and southern chain to the valley in the middle. There can be no doubt that there was once a great lake round its bed. Rounded pebbles of quartz, jasper, chalcedony, and agates, form an extensive deposit on both sides of the stream; there

now remain only a few small lakes, the waters of which are connected by small channels formed in the bed of gravel.

Sixty miles up from the mouth of this stream are to be seen hills of accumulated coarse gravel from the southern mountains, in which saltish clay, marl, and gypsum are interspersed in layers. Round about lie, strewed over the plain, shells which clearly indicate that the ground was recently covered with water. In the plains lying within the mountains, the soil is always impregnated with salt, and it appears not improbable, that the formation inclosing the copper sandstone, and which in the Ural also is always salt, is the cause of this phenomenon. Copper ores are met with very frequently, and even in the most recent stratified rocks of this mountain group. The Akhirit, or copper emerald, was first found by a caravan from Tashkend in beds of grey marl, which seems to be of the same age as the copper sandstone. In the limestone, the copper ores seem to have been constantly the object of the Chudian miner's labours; and veins of copper, silver, and lead, have been brought to light by Russian miners, in the older beds of the southern chain.

It is worthy of observation that, although an east-south-eastern strike predominates in this rocky district of the Kirgis territory, yet single mountain chains are to be met with, having a decided northern strike. In the tract between Orenburg and Bokhara, ranges of mountains, rising abruptly from the plain, have very frequently a northern direction; and it was the strike of the single formations, as well as their mineralogical character, which induced M. Eversmann to look upon those elevations as the southern continuations of the Uralian system. But still more remarkable is it to find such phenomena here, at a much greater distance from the meridian of the Ural.

A chain, striking northwards, extends between the rivers Akchi-kum and Kulan-itmes, which, after uniting, flow into the lake of Kurgaldjin, which is filled by the river Nura. M. Schangin has observed hornblend porphyry on the western slope of this anomalous range, and it is remarkable that this rock, so frequent in the Ural, is never found in that part of the Kirgis mountain system which strikes eastwards. Towards the middle of these mountains is found granite in contact partly with amygdaloid and coarse conglomerates, partly with clay-slate.

Along the rivers of the middle plain, which contain but little water, the right bank is almost always higher, as well as drier and more barren, than the left. On the latter are to be seen at times, extensive and handsome thickets of Loniceras and of white and red roses; but the more elevated plains on the right of the rivers consist only of naked gravel, or else they support Artemisias, some kinds of Atriplex, and Spier-bushes, which dwindle here, though they thrive well on the lakes in the southern part of the government of Tobolsk. A triticum and some other grasses may be constantly seen in these plains, withering even when in flower. On the places covered with efflorescent salts as with snow (Solonzi, from Sol, salt) grow a variety of Salicornias (Solyanki). Siberian trees are confined wholly to the mountains; but, in the middle plain, the forests of reeds surrounding the borders of the lakes supply the Kirgis with fuel, and serve for many purposes as a substitute for wood. On the spots from which the reeds have been cleared they sow wheat with advantage, while, for the irrigation of their other fields, they lead water in canals from the neighbouring mountains.

The travellers who go from Semiyarsk to Tashkend turn at first towards the south-west, and proceed 114 miles over a level steppe, on which fragments of

slate lie scattered under sand and clay. The ground here is extremely dry, and the wells dug by Kirgis at former encampments are eagerly sought for. The water of the little lakes which are met with is always bitter. Then a chain of hills is arrived at, called in that place Kúkásluik, but in its prolongation further on, Bogdu. Trees of the pine kind, affording good timber, stand on these hills. Excellent springs are found among them, yet the vegetation consists only in clumps of bristle-grass on the moist spots, while the adjacent soil remains quite naked. Fine pastures are found on passing these hills, and are frequent along the fifty-two miles from Kúkásluik, to a high range of mountains which is named Karkaralui, and further on, Kénkasluik.

This high range stretches without interruption, westwards to the sources of the Nura, and thence constantly southwards, from the left bank of this river. Travellers follow its northern slope for 100 miles, because, in order to escape hostile attacks, they must have the permission and protection of a Kirgis Sultan, who encamps in summer on the Nura. Thick forests of fir, with birch and black poplar intermingled, adorn the summit of the rocky Karkaralui. They remind the traveller, for the last time, of the widely-spread Siberian woods, for from this place to Tashkend, the total absence of any kind of wood is keenly felt. Bears inhabit the thickets of this mountain; as does the elk (Cervus Elaphus), which is not found in European Russia; and wild swine, which are very numerous in the high reeds bordering the rivers of the steppe, and spread from thence into the neighbouring forests, but not into central Siberia. Willows and poplars stand in the ravines between the mountains along the drains, cut by the Kirgis to lead the water to their fields. Notwithstanding the rugged outlines

of the Karkaralui, easy passes have been found in it, practicable for waggons.

Beyond this group of mountains, the caravans constantly follow a south-south-western direction, in the first place 100 miles to the upper part of the Saruisu or yellow water, on which the Kirgis Sultan of the Tarakliṇsk tribe, belonging to the middle horde, resides in summer. From the extortions practised by this chieftain and the predatory assaults of his subjects, the Russian travellers are secured only by the excellence of their arms. He does not regard the escort of the Sultan living on the Nura, and is ever solicitous to prevent direct communication between the Russians and the people of Tashkend.

In the same manner as the rivers hitherto met with,—as, for example, the Tyundyuk, an affluent of the Irtuish; the Talda and Nura, which fill the lakes of Valkhav and Kurgaldjin, — the Saruisu, also, can be always waded across without difficulty by men, horses, and camels, for in summer these rivers all contain but little water; and even in spring after the melting of the snow, the Saruisu has but a moderate body of water, and the width of its surface does not then much exceed 100 feet. From the southern slope of the high mountains to the Saruisu, and thence again for 130 miles the road goes through a country of low hills and totally destitute of wood. Water fit to drink is obtained by digging wells, or during spring and up to June in small lakes also. The nardus, or bristle-grass already mentioned, here affords abundant food to horses inured to the life of the steppes; but for fuel there is only a poor thorn-bush (probably a Cratægus), so that the traveller here makes his fire, and far more effectually, according to the custom of the country, with dry dung, which the herds of the Kirgis have spread in abundance over the plains.

Of the mountains, Kok-tam-bak, which are reached at the end of this tract (240 miles from Karkaralui), the travellers only relate that they are quite as destitute of wood as any part of the region already passed over. Hills of gypsum, rising out of a reddish soil, are seen at their northern feet; then follows quartz. It is reported that, in their continuation eastwards, there is black clay-slate. Beyond these mountains, for 120 miles, to the river Chui, there extends a plain covered with quartz sand, and named, with much justice, "the good-for-nothing" (in Kirgis, Bitpak), for it presents to the caravans, in combination, all the difficulties hitherto found only separate and in succession. It is only in the spring that drinkable water, from melted snow, is to be found on the surface; when this resource fails, then wells must be dug to a considerable depth, for the wells made use of by the Kirgis who dwelt there a few months before, during the winter, are by this time all become brackish. The only plants seen are Artemisias, and the thorny bush above-mentioned. By day and night there is the greatest reason to dread the attacks of the wild or rock Kirgis (Díkie or Kámenie Kirgísi), who, as much addicted to robbery as the rest of their race, dwell during summer in the adjacent mountains.

The Chui differs essentially in its character from the rivers before-mentioned. In spring its flood is so impetuous that no one dares to ford it, although the breadth of its surface is then but seventy feet; and this condition of its current lasts till the middle of July, that is to say, two months longer than in the other rivers of the steppe. In the course of the summer, the bed is partially laid dry by the powerful evaporation, and the current is completely arrested: the heavy rains, however, at the end of autumn, form broad and saltish lakes near the river, but never

produce the same effect on its current as the melting of the snow in spring, in the country round its sources. In order to carry men, cattle, and baggage across the impetuous stream, the travellers make a kind of ferry-boat with the reeds which cover the banks of the Chui also, and this use of the plant in question shows that it must belong to a larger species than the common reed of Siberia (Arundo phragmites), with which the Russians compare it. Perhaps it may rather be related to the gigantic reeds of the Tibetian countries. Here, as well as in those southern regions, tigers, ounces, and lynxes, love to dwell in the forests of reeds, where they lie in wait for the wild swine, which haunt the same thickets in great numbers. The chase of these wild animals on the banks of the Chui is a favourite occupation and amusement of the Kirgis.

Beyond the river, in the clayey ground which borders it, to a distance of six or seven miles, are numerous level places, covered with efflorescent bitter salts, like snow. Then follows for 26 miles a plain sprinkled over with reddish sand, on which is found, for the first time on the road to Tashkend, besides the Artemisias which are still most common, the species of Tamarisk named Saksaul by the Kirgis, and which is the ornament of the southern steppe. At first it appears as a woody shrub; but further south, with a tall slender stem, two or three inches thick, it assumes still more pleasing forms. Its wood is extremely hard and close-grained. One coming from the north, on the road from Orenburg to Bokhara, 3° 5′ west from Tobolsk, meets the Tamarisk, as a bush, first in the latitude of 47° 5′ North; on the road to Tashkend, beyond the Chui, 4° 5′ east of Tobolsk, in lat. 45°; and on the road to the Chinese town, Kuldja, 14° 5′ east of Tobolsk, also in the latitude of 45°, near lake Alakul; and to Russian travellers,

who meet it for the first time on the northern borders of its natural domain, it always appears a pleasing and quite a novel sight.

The steppe of red sand beyond the Chui terminates at some freshwater lakes surrounded with reeds, and abounding in fish, which are named Kara-kul, or the black lakes. Here the territory of Tashkend is entered upon, and at the same time begins the ascent of the long range of mountain, Karatau, which bounds on the north the best and richest part of this Khanat. From the summit of this range, which is, doubtless, very high, travellers declare that they can see the whole country as far as the mountains of Alatau, at the feet of which stands the capital. From the mountain boundary to the chief town, the country passed through is, according to all the Russian accounts, hospitable in comparison with the steppe. Good springs and running streams are frequent; fodder for the horses is abundant; yet there is no wood for fuel, and the traveller must still have recourse to the thorn-bush already mentioned. From the black lakes (Kara-kul) to Tashkend, is reckoned by the caravan guides to be a distance of 240 miles.

The whole distance from Semiyarsk to the capital may be travelled, even under unfavourable circumstances in sixty days, and by carefully attending to certain rules learned from experience, the difficulties of the journey may be easily overcome. In the first place, May is by far the most favourable month for travelling in the steppe, for drinkable water, which may be found at all times by digging wells to a depth of about fourteen feet, then lies frequently even on the surface. The horses which, besides the camels, accompany the caravan, ought, if possible, to be of Kirgis breed, and to be accustomed to live in the steppe, for the Siberian horses often suffer much from feeding on salt plants and drinking bitter water, and

die on the way. The travellers must endeavour to maintain a friendly intercourse with the Kirgis, in order to be able to purchase sheep and oxen in the camps of those nomades. The use of frost-dried meat, which is found so extremely advantageous in the country of the Yakúts, might also increase the resources of the travellers in Western Siberia.

The tract of country belonging to Tashkend is bounded, 100 miles east of that city, by a range of mountains running northward, and is thereby separated from the Black Kirgis, as they are called, belonging to the great horde, and whose pastures lie in the low plains east of those mountains. Single points of this chain are covered with perpetual snow; and lateral branches stretch westwards from it, among which are the mountains of Alatau, near the capital, and containing the sources of the river Chérchik, which flows about a dozen miles to the south of it.

In the gravel carried along by the rapid Chérchik, some Russian miners have made the experiment of washing for gold, but have found only iron. The same parties saw, higher up the river, in the limestone formation, numerous caverns of natural origin, which the people of Tashkend, however, believe erroneously to be ancient mines; nay, they have even imagined that the stalactites contain metals, and have carried them to the capital on that account. They confounded these caverns with two real shafts, opened in the limestone to the depth of only fourteen feet, and which seemed to the Russians exactly similar to the old Siberian works, and were consequently, like the latter, styled by them Chudskia kopi, or Strangers' pits. The limestone formation is there traversed by masses of horn-stone, containing copper ores. As the country of Tashkend was, in the first centuries of the Christian era, the chief seat of the Turkish races, properly so called, who at that time spread from

the Altai towards the west and south-west, there is nothing surprising in the similar origin of the ancient Siberian and these southern mines. Beyond the limestone on the Chérchik, towards the east, granite makes its appearance. These mountains, as well as those of Kara-tau already mentioned, rise only as insulated chains from the low plain in the territory of Tashkend. The soil of this plain is generally dry, so that gardens and corn fields require canals of irrigation, by means of which the industrious inhabitants have in many instances led the river-waters above a dozen miles.

The Siberians, inured as they are to all extremes of temperature, represent the long-continuing dry heat of Tashkend, during the summer months, as oppressive in the extreme. The ground that was moistened by the spring rains is annually and rapidly dried to dust. Rain does not fall again till autumn. From the middle of December to the middle of February, whatever falls is congealed; but the snow never lies long, and ice on the rivers is quite unknown. At Bokhara, too, the summer is quite as dry as at Tashkend. Showers fall only during the cool season, and most frequently there towards the end of autumn. North of Tashkend, the same meteorological character extends over a great part of the country of the Kirgis, at least as far as the Chui, while in central Siberia it is in summer that the rains are most copious, and towards the autumn they diminish rapidly.*

Although the vegetable productions of Tashkend not only supply the people with subsistence, but furnish also some of the most important articles of their trade with the Russians and Kirgis, yet, owing to the

* The important remark of travellers, that water is to be found at the depth of two or three fathoms in all parts of the steppe, and even beneath the driest surface, proves sufficiently that there is no absolute want of rain even there, but that a great desiccation takes place in the dry season.

above-described peculiarities of the climate, hardly any of those productions can be obtained without artificial and laborious cultivation. Fruit trees, and the mulberry required to feed the silk-worms, are planted in artificially-watered gardens. Cotton grows well; but when towards the close of the last century the people of Tashkend were prevented by frequent wars from attending to their plantations, they were obliged for several years to import wool from their neighbours. Even the richest inhabitants of Tashkend perform with their own hands the labours of cultivating grain, and the chief alone has his fields tilled by the Kara-kasanui, a class of the people bound to military service. They sow rye and wheat in preference, and frequently both together; March and September are the most favourable months for sowing, because the rains then forward the germination. Rice, barley, and spelt are likewise grown in abundance. The crops yield very regularly twenty-fold.

In like manner, barley and grasses are cultivated in gardens, for the horses and camels which are kept in the town. Even the wood required for fuel is reared by the inhabitants in their gardens, in which willows and aspens occupy as much space as the fruit trees. Thin brushwood of the same trees is gathered also in the woody ravines of the Kara-tau, and carried on horses and camels into the town for sale. Among the scanty bushes which grow wild in the vicinity of Tashkend, the Russians have often remarked a kind of juniper.

The people of Tashkend have never kept horned cattle, but have been always in the habit of exchanging with the Kirgis the productions of their industry for the sheep and cattle required for the shambles. Like the Kalkhas Mongols in southern China, the Kirgis are the herdsmen for the Khanats of Tash-

kend, Kokan, and Bokhara; but the relationship which, in China, is founded on subjection and vassalage, rests here on ancient usage, which has never been interrupted even by frequent wars.

They have learned, even at Tashkend, that the intercourse between Siberia and the neighbouring Khanats might be rendered much more advantageous by the extension and more complete arrangement of the cotton trade. In the capital, which is about twelve miles in circumference, and has an estimated population of 80,000 souls, more than half of the inhabitants, men and women, are chiefly employed in weaving. But the result of this industry, exercised by individuals in their own houses, and unaided by the effective principle of the division of labour, remains after all far less perfect than it might be expected that Siberian fabrics would be, which, while carried on in the towns of Siberia, according to the European system, might be abundantly supplied with the raw material by the caravan trade.

Russian goods have been long indispensable to the people of Tashkend, for although the great Bazaar in the middle of their city is destined to receive the merchants of Bokhara and their caravans, yet they are the productions of northern Europe, which these gain-seeking mediators bring here by a very circuitous route. The countries extending from the Caspian Sea to the western confines of China, between the parallels of 45° and 35°, are of such uniform natural constitution, and their inhabitants, in consequence of common descent, have attained so equal a degree of advancement in industry, that a reciprocal exchange of their own productions can hardly ever take place between them. The people of Tashkend pay the merchants of Bokhara with cattle purchased from the Kirgis. Even the fine woollen and silken stuffs, the indigo, and the precious metals, which reach

Tashkend from a great distance, or from India and Persia collectively, through Bokhara, might be much more easily replaced by domestic products and manufactures, than any of the articles received there by indirect channels from Russia. For the future extension of their trade, the southern Khanats possess many productions, which, though wholly worthless at home, are prized by Europeans; thus, at the desire of some Russian merchants, the caravans of Tashkend have brought in large quantities to the Siberian frontiers the Zedoary-seeds, as they are called, or the flower-buds of one of the kinds of Artemisia that cover the southern steppes, and which are used in medicine.

From Nijnei Novgorod, through Bokhara chiefly, and only in smaller quantity direct from the boundaries of Tobolsk and Tomsk, there are now sent to Tashkend, Russia leather; otter (Viverra lutra) and seal (Phoca Ursina) skins from Siberia and the Eastern Ocean; linen, looking-glasses, razors, and combs of European manufacture; but above all, Uralian iron and copper. The eager desire existing in these countries for imported metals need not cause surprise, for long as they have been, in many respects, civilised, and rich as are the mountains round Tashkend in ores, if we may believe the reports of Russian miners, their attempts at smelting are of the most rude and petty kind, such as probably would have been made by the natives of Siberia centuries ago. The process of smelting iron ore is, in Tashkend, often exactly like that followed by those Tatars of the middle government of Tomsk, who are called Kusnétskié Tatári, that is, Smith Tatars (from Kusnets, a smith), and by the Burāts. The furnaces are nothing more than small crucible-shaped hollows in the earthen floor of the house, with an arched cover. The charcoal in it is kept in a glow by rude

hand bellows, and by this means a very small quantity of finely powdered ore can be reduced at once. Although they know how to make iron ploughshares, and things of that sort, from prepared bar iron, yet it costs a great deal of time and labour to weld together, for such purposes, the small pieces of metal which they have themselves reduced.

Such is now the state of the metallurgic art in the very countries which was at one time distinguished by what are called the Chudian or strangers' mines. But it is not improbable, that in those ancient times the inhabitants of these countries possessed, not an acquaintance with more perfect processes of smelting, but simply with that high degree of patience, which often enables the half-civilised artisan to produce remarkable samples of work with rude tools. It is very conceivable that attention was withdrawn from these troublesome occupations, as soon as the possibility presented itself of obtaining the productions of European forges, even by an indirect course of trade. The current money of Tashkend is coined in the ruler's palace, of Russian copper exclusively.

The inhabitants of these countries envy the Russians their skill in metallurgy, on account also of its application to the arts of war. The people of Tashkend know how to make a pretty-good kind of gunpowder, from the productions of their own territory, or the adjacent countries; and it can hardly be doubted that the deadly secret, which, when communicated to Europe, founded an epoch in the history of mankind, was known here, and in the countries in the same latitude, now subject to China, at a very early age. It is a general opinion in the Khanats, that the widely different influences which one and the same discovery has exercised in Asia and in Europe, are attributable to the fact that Europeans have completed the latter by a more skilful working of

the metals. Notwithstanding the constant and ancient application of their own art, together with the exertions of their merchants, they possess at the present day in Tashkend but very imperfect matchlocks. The prohibition which existed since the first invasion of Siberia by the Russians, against the sale of any kind of arms to the neighbouring nations, may help to account for the fact, that in 1823 there were not above 200 of these matchlocks in Bokharia, and that Tashkend and Kokan were no better supplied with fire-arms. Five very rudely made copper cannons, which some travellers saw in Tashkend, had been cast in the place by Russian captives; but the people had never been able to imitate these patterns, nor had they ever erected those cannon-foundries, of which mention is made in certain books of geography. It is well known that the larger kind of matchlocks are fastened on the backs of camels and so fired off; while the heavy artillery, after being paraded before the enemy, is laid, without a carriage, on a mound of earth, from which it tumbles down at every shot, to the imminent danger of the gunner. An insight into the actual condition of the genuine Asiatic artillery, renders intelligible many facts of an early date; thus it appears that the Mongols and Chinese, who already in the eleventh and twelfth centuries, used to fill hollow bamboos with powder, and fire them off to frighten the enemy, much like the cannons of our fireworks, sometimes also using them as true artillery, yet never ranked fire-arms among the regular and ascertained instruments of war, until after they had heard of them from the European missionaries.

As to the early acquaintance with gunpowder, possessed by the inhabitants of central Asia, there are, it is well known, the most satisfactory testimonies from the extreme east as well as west of the country in

question. For while, on the one hand, according to the testimony of the Jesuits in Pekin, this discovery is mentioned in the Chinese writings as early as the beginning of the Christian era, on the other hand, according to Turkish chronicles, gunpowder was used in the Levant as early as the seventh century; and again, we are assured by Voss, that India possessed the secret much earlier than Europe. One ground for this partial superiority of Asiatic art or industry above that of Europe, lies undoubtedly in that spontaneous production of nitre, which is a phenomenon characteristic not only of India, but of the whole region bordering the Kirgis steppes on the south. A report of the abundance in which saltpetre could be obtained in Tashkend, was soon carried by the Kirgis into Siberia, and it was this which occasioned the journey of Burnashef and Pospiélof, officers of the mines at Koluivan, to that place in the beginning of the present century. It was there found, that without any aid from art, nitrous salts, with earthy bases, were deposited in great abundance, particularly on old walls; and that those earthy bases were in the usual manner washed out and replaced by potash. Doubtless, the accumulation of the salts, which are formed slowly by the aid of the surrounding atmosphere, is in this case much favoured by the perfect dryness of the warm part of the year, which, while in direct opposition to the climatic phenomena of Siberia, is yet common to the whole region bounding the Kirgis steppe on the south. In another point of view, the phenomenon is connected as to cause, with the peculiarities of the steppes to the northward. The chemical nature of the salts formed throughout these steppes is not perfectly known; but they often look as if the acids required for their production, were diffused through the atmosphere; for although the lakes in the northern part of the steppe, which yield

annually a rich supply of common salt (muriate of soda) may be supposed to draw the materials from the ground they cover, yet that mode of explanation fails us when we come to consider the more southern tracts which are strewed over with beds of gravel. On the surface of these gravel beds, too, crystals of salt are annually deposited, while fresh water is sure to be found at a depth of fourteen feet. There seems to be something like a special source of the acid contents of the air in the mountainous country between Kokan (95 miles S.S.W. from Tashkend) and Samarkand (146 miles W.S.W. from Kokan), where vapours of sal ammoniac issue from the interior of the earth.

Now that the Russians have become intimately acquainted with Tashkend, its inhabitants are found to resemble closely in person, language, manners, and religion, the ruling population of the neighbouring states of Kokan and Bokhara. The jealousies of the states, and the unsettled rights of rival dynasties, keep up an everlasting political commotion. In the last ten years of the last century, three chieftains contrived to assume the dignity of Khan of Tashkend. They lived in the city, at the same time, in fortified castles; and so violent were their adherents, that no one could venture to walk the streets unarmed. The gardens, plantations, and corn-fields were neglected; and, to complete the misery of the people, the distracted country was invaded by its neighbours. The towns of Turkestan and Chemengen were seized and plundered by the Kirgis from the north; while, from the south, the people of Kokan penetrated to the capital. At last the strongest of the three competitors, Yunus Khodji, got the better of his enemies, both at home and abroad; and already, in 1800, the Russians found the state restored to a flourishing condition. Yet the Khan of Kokan was more fortunate in subsequent wars, for, ten years

afterwards, ambassadors of this prince in Russia, stated that he then ruled Tashkend by a lieutenant.

All the information hitherto obtained from the mouths of inhabitants of Tashkend, Kokan, and Bokhara, relates only to the last score years of their history. The accounts which European literature presents (from Alexander the Great to the eighteenth century), relative to about six different periods, show us very different states of things; but it is probable that truth has not gained by the attempt to unite these isolated facts into brilliant systems, or by the introduction of general ethnographic names, wholly unknown in the country itself, and which embarrass inquiry by the display of knowledge. Thus, for seven centuries, we have been speaking of the country of Jagatai, because Marco Polo states that a chief of this name once reigned over the country between the Caspian Sea and the present boundaries of China. The use of this collective name, which is unknown to the inhabitants, easily misleads to the belief of natural boundaries, which, in like manner, have no existence. Were it necessary to keep in view the former union of the Khanats, then half of Asia might be called Kublai, in honour of the autocrat, who, throned at Pekin, in Marco Polo's time, made Jagatai his lieutenant; but who at the same time, by perfect uniformity of constitution, established an active intercourse between his subjects from the shores of the Chinese Sea to the kingdom of Kasan.

This digression from the main object of our narrative may easily be excused, for it is one of the most interesting phenomena of Siberia, that the roads from the polar circle to lands producing cotton are even now open and frequented. The old lines of communication have not been forgotten, since a new and very remarkable one has been established, under the Russian rule, by the river navigation from the Ural

to the Baltic. Indeed, the idea that Pekin and St. Petersburg, as seats of equal power, may offer to the political world the example of one system composed of chaotically mingled tribes, gravitating towards the two suns, is not so Utopian for the Siberians as for us. In explanation of this view, it is sufficient to observe, that when one hears Danish merchandise called at the present day, in the bazaar of Tobolsk, Varægian goods, it is impossible to resist the conviction that, in the popular mind here, there is no intimate connection supposed to exist between the mother country and the nations lying westward of it.

From the 24th to the 29th October, the wind being constantly from the N. N. E., and the nights clear, the barometer rose steadily, while the thermometer fell to —10°; then, however, the atmospheric pressure and cold diminished, and the wind changing to the S. W. the clouds gathered, and there was a heavy fall of snow. Towards noon, on the 30th October, we saw, while the snow was falling, a clear white circle in the heavens. The sun was in the centre of it, and the points of its circumference, which had an equal altitude with the sun, were of a bright red colour. These coloured portions were not rounded, as parhelia, but were stretched lengthwise, so as to justify the name of Stolbùi, or the pillars, given by the Siberians to this phenomenon.

CHAP. XVI.

THE CHIEF PRIEST IN TOBOLSK. — OBSERVATIONS ON THE SITE OF CHAPPE'S OBSERVATORY. — KIDNAPPING BY THE KIRGIS. — THEIR CRUELTY TO CAPTIVES. — THEIR GENERAL CHARACTER. — SCHOOLS FOR THE INDIGENOUS RACES. — MARRIAGE CEREMONIES IN TOBOLSK. — LICENTIOUS SECTS. — THE EXILES. — MAGNETIC OBSERVATIONS. — THE RIVER FROZEN. — PREPARATIONS FOR THE JOURNEY NORTHWARD. — OSTYAK CLOTHING. — PROVISIONS. — THE NARTE DESCRIBED.

November 1—15. — THE protopope, or high-priest, having requested to be made acquainted with the scientific objects of our journey, we had the satisfaction of becoming more intimate with an individual distinguished for his intellectual endowments and strict piety. It was pleasant to compare the demeanour of this northern priest with the well remembered figure of many a distinguished member of the church of southern Europe. The extreme emaciation of an originally vigorous frame, and a peculiar vivacity of look and speech, sufficiently testified that the retirement of the cloister had not been used for the purpose of hypocritical self-indemnification; but that the priest had, in the national spirit, adhered strictly to his vows, adding to the other observances of the faithful, three strict fasts every week, and a very meagre diet at all times. Corporal self-denial had, in this case, promoted the enviable cheerfulness and elasticity of the spirit; and there was no trace of an effort to prop up the reputation of sanctity by grave looks. We have often observed the same thing, too, in the enthusiastically pious laity of the Greek church, and found their personal demeanour totally different from that of the evangelical

Pietists. It shows the strong and thoroughly practical character of a people, when the religious impulses of the feelings are only strengthened and confirmed by bodily privation, while the understanding and judgment grow at the same time more clear and unaffected. The Russians know well how to satisfy a very strong propensity to devoutness without ever falling into a state of gloomy indifference, or losing their love for the outward world. We found that the favourite subject of our intellectual hermit's speculations was the national character of the Russians: he thought he could discern in the manifold lessons of history the means of conjecturing the political future of his country. Many years' experience had made him acquainted with, and he admired the plastic flexibility of, the lower classes, to a degree which we had never yet witnessed in a Russian of distinction. He enlarged with animation on the strength of will and abundant resources with which the Siberian Kosak turns every circumstance in nature to account; he rejoiced that the people in his diocese built their houses in such a variety of ways, and, that driving reindeer and dogs, also, in their vehicles, they derived such unusual assistance from the animal creation, that even the historians of the Roman world had nothing like it to recount. But, in order that the now divided strength of the northern Prometheuses should be hereafter more united, so that the country might arrive at a higher degree of culture, our prophetic friend thought that the proper rule to be observed was that contained in the law "de non prolatandis finibus imperii." The reformer of that new epoch should be called not Vladimir, but Vladimir; that is, not ruler of the world, but ruler of peace. Our conversations grew less agreeable, and our efforts were wholly thrown away, when we endeavoured to satisfy the old man's curiosity, by ex-

plaining to him the physical problems which we aimed at solving. For, while the Russian convent education had opened his eyes to the phenomena of the spiritual world, it had left him in total ignorance of experimental philosophy.

The evenings of this week were devoted to the observations necessary for determining the geographical position of Chappe's observatory. A sledge was now at our command to carry the necessary apparatus from our house to that point, which was about two miles off. But it often happened, that, immediately after sunset, a thick fog covered the lower town, while on the hill the stars remained still visible; the fog, however, still ascending, completely enveloped us by the time we had set up the instruments, so that we had to wait a long time among the desolate ruins for a favourable moment. On the 4th, 7th, and 15th of November, I at length obtained the long wished-for results; fine, clear nights, with a temperature of —10°,—15°, and —20° R., having set in with a brisk north-west wind. All anxiety as to the annoyance likely to result from the cold vanished completely after these first winter-labours in the open air, for so effectual was the protection afforded by the furs, that we knew of the cold only from the thermometer. Indeed we had now adopted, for the first time, the Ostyak mode of covering the legs; and still more was gained in facility of movement when, subsequently, we substituted the well-sewn reindeer skin coat of this people, for the pelisse of wolf's fur usually worn by the Russians. It required some practice to avoid letting the vapour of our breath touch the glasses of the instruments, which it immediately obscured by congealing on them.

The transit instrument was here made use of, according to the excellent method introduced by M. Bessel, which gives to the physical and geographical

labours of travellers, an accuracy hardly attainable hitherto. With the indulgence invariably manifested by him towards labours resembling his own (solely in the labourer's intentions, but not in pregnant consequences), the celebrated inventor of this method examined our observations, which were sent to him while we were still in Siberia, and announced the agreeable result that they gave the latitude of the doubtful point about 8″.1 less than those of Chappe; but that, from the perfect consistency of the separate data, the new determination was decidedly to be preferred. By measuring a base line on the northern wall of the town, and connecting a triangulation with it, Professor Hansteen had traced very accurately a plan of Tobolsk, which he communicated to us; and thus the observations made in various parts of the town, formerly by Schubert, and now also by ourselves, were all rendered applicable to the determination of the site of the classical observatory.

The conversation of a Kirgis belonging to our host, and who was a constant companion of our nocturnal trips in the sledge, contributed not a little to compensate us for our tedious disappointment while lingering in the lonely German churchyard. He told us how, when he was a lad of sixteen — and boding no good — he was enticed by his father from the steppe to the Siberian frontiers, and was there handed over to some Russian merchants in discharge of a debt of 180 roobles. He travelled with his new master to Tomsk, and, being dismissed from thence, he entered immediately into the service of his present owner. The only tidings he had since received from his own home were, that his unnatural father had met with the punishment due to perfidy, being killed by some Russians with whom he had quarrelled. Perhaps for the sake of the appearance of revenging himself on fate, the otherwise good-natured man re-

lated, with rare glee, how he, too, had renounced the children whom he had reared at Tobolsk from his marriage, and had given them into servitude to other Russians. Among the inhabitants of the steppes, the trade in the human being is ever a favourite business. Cases, however, like the present, which display an unnatural want of feeling in parents, are of rarer occurrence. Sometimes the eldest son, on the death of the father, gets rid in this way of his sisters, the support of whom devolves on him; the kidnapping of children is generally the work of families at variance, who thus take revenge on one another. The Kirgis who are so numerous in service in western Siberia, and those in Bokhara and the other Khanats, have been all carried off in this way. Those Kirgis, in particular, who attend the merchants of Bokhara through the steppes, have quite a passion for kidnapping their neighbours' children; and, it is said, that in consequence, whenever a caravan in the steppe passes through an Aûl, or inhabited place, the mothers, with the anxious bustle of cackling hens, drive their children together into a felt tent or Kibitka, and there guard them from their itinerant fellow-countrymen.

When they deal thus with their own kin and kind, it may naturally be expected that they will show but little mercy to strangers who fall into their hands; and this supposition is confirmed by those Russians who have been carried off into the steppe, and have not been sold, as is generally their lot, to the inhabitants of the Khanats. Our Kirgis friend declared to me that he knew nothing of the custom, attested to me previously, and by most credible witnesses, as existing in the little horde, of knocking Russian prisoners dexterously on the head in such a way as to blunt their intellects, and so render them less capable of effecting their escape. But, on the other hand, he

described, as an eye-witness, a cruel practice, usual in his own tribe, and having the same object in view. When they have caught a Russian, and wish to retain him in servitude, they cut a deep flesh wound in the sole of his foot, towards the heel, and insert some horsehair in it. There is then no doubt, that even when the wound is externally healed, he will abide for the rest of his life, by a leading rule of Kirgis national manners; for, as the Kirgis is always on horseback from choice, so the maimed Russian becomes a confirmed equestrian from the pain of walking.

In the time of Herodotus, it was the custom of the mare-milking inhabitants of the Pontic steppes, to put out the eyes of the captives whom they reduced to slavery. It is in vain that we seek for some middle term, or justification of the inference, when we compare this statement of the old historian with the explanation subjoined to it, "This is their way, because they are wandering shepherds, and not tillers of the ground." At all events we see, that what startles us as a general theorem is borne out as an acute observation; for, almost exclusively, an inclination to such cruelties is found only among the nomade inhabitants of the steppe. Yet since that time the Mohammedan religion and its precepts have done something towards mollifying those very indocile tribes; for not only has the practice of blinding been superseded by that of a mutilation far less destructive, but they have long since forgotten the customs of drinking blood, and of turning to various uses the skins of their enemies, as well as the drinking-vessels from the bloody skulls of their fathers; which at a much later period (the thirteenth century of our era) were found to be in use only among the inhabitants of Thibet, with whom probably the custom originated.

If the inhabitants of the steppes have been rendered in some degree more accessible and sociable by a

tincture of religious enlightenment, the same influence has had a decidedly contrary effect in the neighbouring countries, which were previously not without civilisation. This is attested by all the Russians who have escaped from Kirgis bondage to the Khanats; for although the arrival of a Siberian in those countries is always a welcome occurrence, as he is sure to possess some skill and practice in the arts of peace or war, in which they are most deficient, yet a blind religious zeal always steps in to frustrate the expectations of mutual benefit, which might, in such a case be reasonably entertained by both parties. In Tashkend and Kokan, high offices, advantageous marriages, and other similar inducements are frequently offered to the Russian slaves, on condition of their making some kind of confession or declaration in favour of the ruling faith; but as they cling obstinately to their own creed, they are ultimately treated with the utmost harshness and contempt. Unfortunately, the two parties thus coming into contact are equally fanatical, for the Russians themselves, who otherwise show great pliancy in the ready adoption of foreign manners, are, in matters of religion, quite inflexible, and they can very rarely be induced to make any sacrifice of this kind to the least appearance of foreign influence, or to their own interest. Assuredly the Khanats and Siberia would have been long since on a footing of intimacy mutually advantageous, if it were not that the great majority of the Russian captives forget every prudential consideration in their extraordinary zeal for martyrdom. Their scorning of offered freedom is still more remarkable, since many of those to whom the offer is made, are Brodyági, who, in their eagerness to escape from servitude in their own country, rashly hoped to find an easier lot in the neighbouring countries of which they knew nothing. After an oppressive captivity among the Kirgis, they think that in the

Khanats they have at length attained the object so long pursued, and yet they remain, of their own choice, just what they were in the first instance, — Christian slaves; but, in this case, under Mohammedan masters. The Tatar caravan guides constantly relate in Siberia histories of this kind; and the Siberian merchants who visit the Khanats are accustomed to encourage and commend the Christian steadfastness of their fellow-countrymen, without, however, opening to them by ransom the wished-for way homeward.

It was an interesting result of the agency of that tutelar genius who watches over poetry, that we should here learn from the mouths of the song-loving Russians, a Spanish romance or ballad, relating to the times of Charlemagne. Like the Mammoths of ages long since gone by, so it would appear that the productions of southern genius too, which had long passed away from the rest of the earth, were preserved in the midst of the ice of Siberia. And, indeed, such permanence here is not inexplicable, for in reality, in respect to mind as well as matter, these northern countries are extremely poor in decomposing and modifying influences; and the Kosaks, left here for centuries as forlorn outposts, may be very naturally supposed to have preserved, even as to the songs, the habits of an army long since extinct. But the matter may be viewed from another point of view, owing to the resemblance between the theme of the song and the circumstances above mentioned, which are of daily occurrence in Siberia. The traveller in Asia now hears from the Russians the very same ballad of Roncęval which Don Quixote heard from a Spanish peasant, and which celebrates the Christian steadfastness of the captive Guarinus, and his magnanimous scorn of the reward offered him by Marlatessa, the king of the Moors, if he would become a convert to Islam. Carried by Russian soldiers into the heart of

Siberia, and by sailors, on the other side, to the east coast of Kamchatka, these verses may possibly have been preserved so long among the posterity of Yermak because they have a pointed reference to every day's experience.

Respecting the Kirgis living in Tobolsk, it is stated by physicians, that they are subject to a kind of jaundice, unknown to the Russians. Whatever connection may be supposed to exist between this disease and the passionately susceptible temperament of the natives of the steppes, yet it is evident that the change in the mode of living is at least accessory in producing the malady, of which the Kirgis know nothing in their own homes.

Among the dietetic peculiarities of the steppe may be mentioned, besides the constant use of milk in various forms, the perpetual eating of mutton also; which the Kirgis deem so wholesome and well adapted to the human stomach that they give the fat tails of the sheep to their children to suck. On the other hand, they have a decided aversion to veal. Prejudices of this sort may in general be the more safely taken as proofs of ethnographical relationship, the more groundless they are in themselves; and hence, it is worthy of remark, that in Russia, at the present day, veal is contemptuously rejected by the devout populace, while those who would seem more enlightened, decry it as being unwholesome. The other dietetic principles of the Russians are observed by them, in common with the Jews, but this one is evidently of more ancient origin.

In the case of the Kirgis, one might regard the abstinence from veal, as originating in motives of good husbandry, and from a desire to spare the horned cattle, which were introduced much later among them, and still require much more care than sheep and horses. It is much more difficult to

account for the prejudice of the Russians in such a way, but if we ascribe to it a higher antiquity, then it must be remarked, that among their Scythian ancestors, as described by Herodotus, there existed the closest similarity in every respect to the hordes who now inhabit the steppes. But, on the other hand, if we compare this somewhat singular custom of the Kirgis and Russians to other usages having more or less of resemblance to it, we cannot fail to call to mind the prohibition to kill the cow, which continues at the present day among the Hindoos, but which, in the time of Herodotus, was general in the Lybian desert west of Egypt, and partially in the Cyrenaica, where the women alone abstained from cow's flesh.

If Hindoo merchants in Bokhara now lament loudly at the sight of a piece of cow's flesh, and at the same time mix with their food, that it may do them good, the urine of a sacred cow kept in that place, there can remain as little doubt as to the religious meaning of the prohibition at the present day, as there existed in ancient times, in respect to those countries of which Herodotus relates the same thing, and in which the heifer was an object of worship as the representative of the goddess Isis. This, however, does not yet explain the purpose of the prohibition, for one must now inquire into the causes of the religious honours paid to the cow. We see that when Pythagoras examined, as a speculative philosopher, into the religious usages of Egypt, and deemed them worthy of recommendation to his countrymen, he looked upon the worship of animals merely as a means, but considered the object to be that man, not corrupted and misled by habitual slaughtering, should be made mindful of his duties to all living creatures. He was of opinion that, while it was in general wrong to kill, the slaughter of the

gentle, innocent, and useful cow, was the most hard hearted of all cruelties.

It is possible that the prejudice which induces the Russians and Kirgis to spare their calves may be a remnant of this ancient philozoic doctrine. Since, being compelled by necessity to kill the older cattle, they would abstain at least from afflicting two creatures at once, and from adding to the bloodshed the mournful cries of the bereaved mother. At any rate we see here the way in which ethnographical deductions are connected together, even when they are founded on the similarity of customs to which one would at first ascribe a merely local origin. A like admonition to be cautious was contained in the information which we received about the same time in Tobolsk, that the singular Russian custom of showing particular respect to weak-minded persons (blajennie, or blessed), was observed just in the same way in Tashkend.

We had an opportunity of becoming acquainted with the extremely sensitive temperament of the Kirgis by observing the individual of that nation whom we met with at Tobolsk. They are not only prolix in discourse, but they are led by a peculiar loquacity into frequent monologues or poetical improvisations, and the Russians very faithfully describe this propensity of their neighbours by the playful saying: O'ni cho vídiat, to i brédiat, "whatever they see gives birth to fancies." But the passionate character of the Kirgis living in the Siberian towns is often manifested in violent deeds of revenge and fearful anger, and hence they are often to be seen in the ostrog, or prison in Tobolsk, along with the Russian convicts who are to be sent further east.

The Kirgis may be distinguished from the Russians at first sight by the black hair, the dark, sunburnt complexion, and small lively eyes between strongly

projecting lids, and, indeed, by the whole cast of the countenance. They might be more easily confounded with the Tatars of Kasan, from whom they differ only in being less tall and well proportioned, and in having the gait peculiar to horsemen. If, in spite of the constancy of this external character, and of the most intimate connection between the Tatar and Kirgis languages, the Kirgis, are to be reckoned, in the higher ethnography, as belonging to a certain fair complexioned and blue-eyed race, from which sprang also only the German and Sclavonian nations, it must be at least admitted, that the poor inhabitants of the steppes may at the present day be very aptly compared to an old knife with a new handle and a new blade.

For the wished-for departure on the way to Obdorsk, it was not enough that the snow road had become fixed; it was necessary that the rivers also should be in a condition to bear a sledge. The complete freezing of the Irtuish, however, was delayed this year beyond the usual period. Flakes of ice drove past the town as early as the first week in November, but their size and number frequently decreased, probably in consequence of a higher temperature in the country up the river, and the descent of warmer water. On the 10th November, very large masses floated down, but the straightness of the river's banks, and the strength of the current (nearly 4·4 Parisian feet in the second), prevented their joining together. We had no alternative, therefore, but to remain quiet, and to enjoy our opportunities of becoming more intimately acquainted with the joys and the sorrows of the good people of Tobolsk.

The superintendent of all the Siberian schools, M. Slovtsof, allowed us to visit the institutions on the Lancasterian or mutual instruction system, which are here established in the chief places of the govern-

ment, and of the subordinate circles, and are well calculated to make amends to the natives of Siberia for the long-felt wants of their original country. The attempts to induce the aboriginal races in the neighbourhood to send their children to these schools, have not been so successful in Tobolsk as to give these institutions all the importance of which they otherwise seem capable. It would evidently be an easy matter to adapt these mixed assemblages in such a way, for the thorough acquiring of the Asiatic languages, that European linguists would feel obliged to study in them as in universities. It would be then as easy for us to obtain a well-grounded, grammatical knowledge of the Kirgis, Ostyak, and Samoyede languages, as we can now acquire of the Tatar, of which an excellent dictionary was published at the beginning of the present century by M. Joseph Tigánof, who was the professor of the Tatar language in the public school at Tobolsk. Here, as in England, the first exercises in writing are given on a table covered with sand; but the teachers in Tobolsk maintain that this idea did not reach them from Europe but from Irkutsk, in the neighbourhood of which place the Lamas or priests of the Burāts have been long in the habit of employing this mode of instruction.

Another school intended for the children of the soldiers and Kosaks was visited by us, but only during play-time, when the school-room is often converted into a ball-room. General Bruhl, who commands the artillery of Western Siberia, has the merit of introducing the French style of dancing, or at least of trying to make it fashionable in Tobolsk. The military bands and church singers joined their efforts to lend attraction to his balls, which were numerously attended. It is no want of instrumental music, but the national taste, which makes the people here accompany most of the French dances, as well as their

own with singing, and when one is a little used to it, there is nothing disagreeable in a song emphatically delivered in the measure of a waltz or a cotillon.

On Sunday the 9th November, we saw, in what is called the German church, a very oddly mixed congregation of exiles and voluntary settlers. Germans, properly so called, are united in this congregation with the Finnish Lutherans, who have been numerous here from a very early date. Ministers speaking both languages are brought from Finland, and maintain here the old Lutheran form of worship used in the Russian Baltic provinces, and to which the Germans have lately begun to return.

We were still more gratified by taking part in some ancient Russian usages, which are here preserved among the genuine Siberian portion of the townspeople, in much greater purity than in the mother-country. For example, marriages in Tobolsk are still celebrated with all the ceremonies, Christian and Pagan, of their earliest forefathers. The Svákhi or match-makers, already mentioned, are charged with the management of four different solemnities, the completion of which precedes the wedding or proper marriage ceremony, and which are sometimes separated from one another by considerable intervals of time, so that the interesting drama may not be brought too soon to a close. First, in the *Svidánie*, as it is called, or the first meeting, the chosen lady is conducted by the Svákha, and shown from a distance to the gentleman who aspires to her hand. Then follows, in the bride's house, the *Smótriénie* or near view, which, like the preceding ceremony, does not bind either party; and these trials being satisfactorily gone through, the festival of the *Rukobítie* or striking of hands, is celebrated before witnesses. Finally, the *Devishnik* or maiden's feast forms the fourth and last of the secular ceremonies. It is customary in Tobolsk,

on this occasion to treat the female friends of the bride to tea, cedar nuts, and wine, and to make them sing, led by the Svákha, the old and very numerous wedding songs (Svádebnuiya piesni), most of which require to be adapted to the circumstances of each case, by the insertion of the baptismal and patronymic names of the happy couples. They almost all contain complainings of the bride, who is usually compared to some water fowl, a swan, goose, or duck, separated from its beloved element. In the evening of the same day takes place, in the presence of the bridegroom, the decisive untying of the bride's head-dress.

At the wedding, while the priest gives his benediction in the church, the young couple set each a foot on the carpet spread between them; at the same time, during this ceremonial, as well as during the subsequent marching round the altar, crowns of metal are held over their heads by relatives selected for that purpose. These crowns are now denoted by the term vienetz (pl. vientzi), the older form of which, vienò, was used by the heathen Russians to signify the price paid by the bridegroom. If it be supposed that the form of the word intimates rather that twigs of trees (viétvi, vienniki) were used to adorn the slave bought for wedlock, yet it is certain that in the oldest of the wedding songs now used, the smith is commanded to make a metal vienetz.

The church ceremonies having been all completed, we saw another form of benediction gone through, in the house of the newly-married pair, by their parents, or persons chosen by the latter, and which is called óbrasom blagoslaviti, or blessing with the holy images. This name, however, refers to only half of the ceremony practised, for, after setting the holy image intended for the new household on the head and the shoulders of the pair to be saluted, the same form is repeated with a large loaf and a basket of salt. Both

kinds of blessing are received on the knees, and the bride, along with the female witnesses of the proceeding, takes care to attest loudly the veritable contact.

At the same time that the liking for matrimony seems to be proved and fostered by these solemnities, the totally different views and dealings of the ancient Phrygian Ἀτύς, or worshippers of Cybele, have found their way into Tobolsk. In the most direct opposition to the Súsliniki, mentioned above, the sect of Khlistóvchina, which has existed in Russia from very ancient times, and the members of which are called also Skóptsi, not only abjure all obedience to sexual impulses, but also engage to suppress them totally by mutilation. At the beginning of the present century, this equally singular and mischievous doctrine had taken such a hold in the government of Simbirsk, that it was found absolutely necessary to deviate from the general rule of perfect tolerance, and to suppress those tenets by persecution. But the delusion, apparently suppressed, rises into view from time to time in different places; and it is not many years ago that a large society of Skóptsi existed among the soldiers settled in Tobolsk.

In the houses of the Siberians and Germans we frequently saw many of the exiles living in Tobolsk, who are here called by the mild name of "*The Unfortunates.*" Those convicted of treason or offences against the state are sent to reside further to the east, or to the north, nearer the Icy Sea; and the only exiles here met with, of the better classes, are officers who have been guilty of fraud or breach of trust. Many of these have formerly served in Eastern Siberia, and the sentence of exile has had the effect of assigning them a place of residence nearer to Europe. In this condition was a former governor of Okhotsk, one of the oldest and most experienced of the inhabitants of Tobolsk, who gave me much valuable advice

respecting my intended journey to Kamchatka. All these unfortunates, as they are called, live in the town in perfect freedom; and, with the exception of some newly-arrived exiles, who are obliged to do penance in church, they seem quite exempt from any special control or watchfulness on the part of the police. Many of the older ones do the same thing of their own accord, and doubtless from sincere conviction. These aged exiles pass over from the luxury of Moscow to the frugal simplicity of Tobolsk with true manly equanimity. They let their beards and hair grow; and as they say themselves, they find the life of the Kosak and the peasant far more supportable than they once believed. Hence it is easily conceivable, that the children, whom they bring up from marriages with Siberian women, totally lose all trace of so remarkable a change of fortune, and that the Russian nobility employed in Siberia in agriculture, hunting, or any other *promuisl*, are as little to be distinguished from their neighbours, as the posterity of Tatar princes.

The Jews alone, here as elsewhere, resist the assimilating influences which surround them. There are but a few provinces of European Russia, as it is well known, in which Jews are allowed to settle permanently; in the rest, they sojourn under the same conditions as other foreigners; generally for trade's sake, as foreign guests, with a permission granted for a certain time. But in Tobolsk, and further eastward, we frequently met with them, either as exiles, who in the course of their travels had been guilty of some infraction of the law, or the children of such exiles. In general, and in consequence of their known political position, popular opinion is more favourable to the Jews in Russia than in most other countries; for here in Siberia, this parasitical people is considered almost as an independent nation; and they are thought to have the same origin as the Germans, because the

Jews who enter Russia, and from thence penetrate into Siberia, all use the German language. It is, indeed, a remarkable fact that, even in earlier times, wanderers of this persuasion have reached Russia only from the west, and never from the Jewish communities settled in Bokhara, Samarcand, and Persia.

In the account of my geographical and magnetical observations, I shall enter minutely into the interesting matter which occupied us during the last week of our confinement in Tobolsk; namely, the periodical variations of the direction of the magnetic meridian. As the immediate result of these observations, and of the similar ones which we had already made at various points of our route, it appeared clearly that the magnitude of these oscillations was quite independent of the mean declination of each place, and that the season of the year alone had an influence on the amount of the periodical irregularities. But if each series of observations, made in the course of the journey, was compared with a previous determination made at the same time of the year, at the point of departure, then they were both found to agree very nearly as to amount, although at Berlin, St. Petersburg, and Moscow, the mean declination is westward, and in one case (Berlin) very great, in the others much less; but at Yekaterinburg and Tobolsk it is always eastward, and likewise of very different amounts.

No less distinctly evident was the uniform dependence of the phenomenon on the solar time of each place; for in every place, and at all seasons, the magnetic meridian lay furthest east about eight o'clock in the morning, and about two in the afternoon it was furthest west from its mean position. At Tobolsk these movements were of very small amount, as might be expected from the position of the sun in winter; but irregular increase of these movements took place twice. Our attention was so much the more anxiously

directed to the well-known connection between these anomalies and the Northern Lights, as it might be reasonably supposed that we were much nearer to the true seat of this phenomenon here than in the middle of Europe. On the 9th of November, about 6 h. 50 m. true Tobolsk time, the horizontal needle began, on a sudden, to oscillate violently, the mean of the oscillations being east of the mean magnetic meridian, about double the amount of the total periodical change. About a quarter of an hour afterwards, the sky, which was overcast at the time, cleared completely; but there was no trace to be seen of the Northern Light; yet the anomalous deviation continued, and it was not till 8 h. 30 m. that the needle resumed the direction corresponding to the hour. Again, on the 11th of November, about 9 h. 35 m., we saw the needle deviate to the east; but this time, threefold the amount of the periodical variations. At the same time were to be seen, in the eastern half of the sky, white masses of light in motion. Twice there was formed a roundish, white spot, which moved from the left of the observer to the right, and then vanished. About 9 h. 48 m. the white nebulous light had taken the form of an arch, the concave side being towards the horizon, and the highest point of it about 5°.2 south of the true east; that is to say, about 85°.6 east of the magnetic north. It appeared as if the brightness of the phenomenon was diminished by vapours in the atmosphere; for the stars, too, in all parts of the sky, shone less clearly than usual. The arch, and the portions which detached themselves from it with a motion upwards, were not brighter than clouds illumined by the full moon. Yet the form and movement of the whole were such as to leave no doubt that it was a true Aurora Borealis, or Northern Light; and the observation of its culminating point, in a position so far from the line of the magnetic meridian, seemed

worthy of attention. The inhabitants of Tobolsk may well be supposed to let such faintly luminous phenomena pass frequently without notice, when attention is not called to them by magnetic symptoms. Yet we had abundant testimony to the effect that more brilliant and better developed phenomena of this kind are not much more frequent in Tobolsk than under the same latitude in Europe, and far rarer than in places on the Northern Obi. Dr. Albert, though constantly attending to atmospheric phenomena, observed but once, in the course of fifteen years (8th of February, 1817), a northern light which was brilliant and lasted the whole night. In the same year, on the 2d of January, there was noted in his journal "a twilight in the night;" but as the nocturnal illumination of the sky at that time of the year cannot have proceeded from the sun, this may be possibly another instance of an Aurora, only less luminous.

The ice which drifted down the Irtuish so rapidly on the 10th of November became fixed on the following day; perhaps, because the floating masses immediately preceding them had arrived at a part of the river already closed up. With the air at —15° R., little time was required to freeze the water, now flowing slowly between the flakes; and already on the afternoon of the 12th of November, peasants with their horses and loaded sledges crossed the Irtuish, near the town. On the 14th of November, under a bright moon and a dark blue sky, the broad mirror of ice, lent a new charm to the fine wintry landscape, and we were able to view from the middle of the river, and for the first time, the snow-clad houses of the lower town, and the picturesque hills, at one and the same moment.

November 16—21. It was a joyful business to make the last preparations for the journey to Obdorsk. It was necessary to arm one's self in the accommo-

dating and opulent town, against all the obstructions that might arise from man, weather, or hunger, and then to look after suitable vehicles.

Instead of the passport given me in St. Petersburg, General Velyaminov deemed it expedient to provide me with one, drawn up in his own name, and addressed to the village authorities of the northern circle of Beresov. For in those places, so far removed from the great road of Siberia, the people know little of the power which issues immediately from the centre of the empire, whereas the Russians scattered towards and around the Icy Sea never forget Tobolsk.

It was still more important that a Kosak, acquainted with the Ostyak language, was appointed to accompany us, along with our faithful and good tempered Esthonian. While we were making our preparations in the town, the guide, who had frequent experience of the journey northwards, already proved to be of the greatest use to us. For he contrived to procure in the town Ostyak dresses for the whole party; and so easily did we become reconciled to this excellent covering of fur, that not one of us, after leaving Tobolsk, would have cared to resume European apparel. It appeared to be no slight advantage at the same time, that, transformed as we were, we might hope to be received by our future hosts with a more open and hearty welcome, than they usually extend to those who shock them by a foreign exterior. Even here in Tobolsk, where things of this kind are seldom desired but as curiosities, one can buy for twenty roobles a suit of raiment, the several portions of which, from head to foot, offer all that can be required for every season of the year; and so effectually is it put together, that a suit may last a man for half of his lifetime.

To satisfy the demands of the stomach, it is as well to be provided with a copper kettle, to prepare

water for tea from ice or snow, and to be able to dress the fish procured from the Ostyaks. But for the rest, one has in Tobolsk an ample choice of articles of food quite ready, and not liable to spoil. In order to give some idea of the value of money here, I have noted the prices of many of the articles purchased, which would no doubt, have been bought much cheaper by natives of the place. In the Gostini dvor of Tobolsk, we paid for —

Five large loaves of rye bread	0·50 roobles
14 lbs. of ham	2·6
3 lbs. of black caviar	2·50
Four fresh salted Muksums	2·0.

The kind of salmon known by this last name, and highly prized by the people of Tobolsk, not without good reason, is two feet long, and weighs from six to eight pounds. It is here to be had in the state called fresh salted, for which purpose it is slit into halves down the back; but, besides, large quantities of it are sent frozen and unsalted to Irkutsk, whence, by way of substitute, the smaller kind of salmon, called Omul, which is always salted and still cheaper, is sent all over western Siberia, as far as the Uralian Mountains.

A good stock of the stronger drinks, too, may be laid in at a very moderate price in Tobolsk. Not only may six quarts of Madeira, and two quarts of brandy be had for eighteen roobles, but two kinds of porter also, as it is called, were here to be found, the one imported from England into St. Petersburg (Anglinskyi Portr), and the other made at St. Petersburg in English breweries (Kronskyi Portr, from the name of the first owner of the concern). The wine had the advantage of remaining unchanged through the greatest cold; whereas the strong beer froze, but, remarkably enough, and perhaps in consequence of

the constant motion during the journey, without bursting the bottles. We soon learned, moreover, that all these drinks may be well dispensed with on a winter journey in Siberia, and are less conducive to the traveller's comfort than tea, which is above all praise.

The carriage in which we had travelled hitherto, we left behind us in Tobolsk, for European vehicles of this sort, when fitted to slide with runners placed under them, are inconvenient even on the great Siberian roads, but in remote districts, the use of them is quite impracticable. Instead of it, I got, in Tobolsk, two sledges of different kinds. The larger of the two was what is called Súnnaya povóska, or winter carriage, of the construction most usual in Siberia for travelling, but adapted only for horses. The whole body of the carriage, made entirely of wood, about four feet deep and seven long, including the vaulted roof, was covered within and without with bast mat or felt; and a long bast mat fastened to the edge of the roof, could, according to the weather, be either thrown back or be braced over the open part of the sledge. Vehicles of this kind are never without the important addition of the otvódi or guides, which prevent a total upset; although in the course of a rapid journey the perpendicular line from the centre of gravity of the carriage often falls outside of the base formed by the runners. The otvódi are two strong bars placed lengthwise at the side of the carriage, converging and rising forwards, in a plane about four or five feet above the runners, and with their hinder ends three or four feet wider asunder than the latter. In loading the vehicle, care is taken that the centre of gravity of the whole is not raised too high above the plain of the otvódi. As towards the end of the winter, the snow ways, which are constantly travelled upon, have an undulating surface like that

of a stormy sea, and give the sledge a motion so like that of a ship tossed on the waves, that travellers unused to it often grow sea sick on the road, it is obvious that the use of the otvódi is a very necessary precaution. The oglóbli, or shafts, are in these, as in all other Russian winter carriages, attached near the front of the runners. The effect of the postriómki or yoking straps, which are never used in Siberian sledges, must be supplied in the case of these shafts by their own elasticity. In yoking side horses, bars are fastened in front of the runners, under the oglóbli.

The other sledge, which we took with us on our journey to Obdorsk, was what is called a covered Narte (krúitaya nárta), which are used by the Russians only in those districts of the furthest north. This vehicle, owing to its lightness, may be drawn by either dogs or reindeer; and, at the same time, it is capable of affording complete protection from the weather. On the runners, which were about three feet asunder, was placed the quadrangular body, four feet high and about seven in length, made altogether of thin laths of wood joined close together. At the side was a door, and behind it a small window, closed with a plate of talc. It was covered inside and outside with doubled Tatar felt. The traveller lies at the bottom of the coffin-shaped body. The abundance of room allowed us to pack our instruments more conveniently. There is also a box for luggage in front, under the driver's seat. The mode of yoking horses to it is the same as that already described in the case of the larger sledge; the management with reindeer and dogs will be related hereafter. These covered Nartes are never fitted with the guards against upsetting (otvódi), and yet, owing to their narrow base, it requires much care in loading them to make tolerably safe. Yet accidents

occur often with them, though not so often as might be expected, if it were not that the snow ways, in the tracts where these sledges are used, do not assume an undulating surface; and furthermore, that over rough and uneven ground, these vehicles, which are at all times rather heavy for dogs and reindeer, go with very moderate speed.

The post from Beresov to Tobolsk had already travelled by the winter-road for the first time this year, when, on the 22d November, we began our journey. On this day I looked forward with impatience to the hour of departure; but the desire of making acquaintance with the Ostyaks was obliged to give way to social obligations towards earlier friends, and these connected with our fatherland; for on this very day the Germans in Tobolsk kept the feast of Martinmass, as a Lutheran commemoration, and it was not till the afternoon, when the feast was over, that we left the hospitable city.

CHAP. XVII.

JOURNEY TO OBDORSK. — THE ICE-ROAD. — FORESTS OF THE IRTUISH. — TUGALOVA. — MODE OF FISHING. — VEILS OF THE OSTYAK WOMEN. — OSTYAK SONG. — REPOLOVO. — FISH-SKIN WINDOWS. — NETTLE-CLOTH. — LIMITS OF THE ELK AND REINDEER. — OPENING OF THE FISHERY SOLEMNISED. — SAMAROVO. — THE FIRST STONES IN THE PLAIN. — YELISAROVO. — FISH-TRADE ON THE RIVER. — KEVASHINSK. — DRAUGHT-DOGS. — CONFLAGRATIONS IN THE FORESTS. — REPUTED ENMITY OF THE ELK AND GLUTTON. — OSTYAK BOWS AND ARROWS. — KASUIMSKIE TRIBE. — DOG-SLEDGES.

THE moon was rising as, about four o'clock in the afternoon, we reached the northern gate of the upper town. We continued on the right or high bank of the river, and the snow-way being excellent, the sledge glided rapidly and smoothly through the ravines that intersect these hills. The first stage, Trétyinsk, is twenty versts from Tobolsk, and in this distance we passed through a thick pine forest, so that the clearing of the wood appears to have taken place only in the vicinity of the town. In the Russian village, voluntary carriers (volníe, called also okhotniki, or amateurs,) undertook to horse our sledges at the rate of three kopeks for each horse and verst.

And from this place, too, it was necessary, as we were told, still to travel on the mountain road, that is, on the high bank of the Irtuish, and not upon the ice. We reached Brónikovo, forty versts from Tobolsk, four hours after our leaving the latter place: we found it to be a good village, with a stone church. The sky was clear, and the temperature of the air —16° R. Then, running over twenty versts, we

passed close by the Tatar settlement of Philátevsk: we crossed the river soon after, and continued as far as Karabinsk on the snow-way of the low, left bank.*

From Karabinsk to Nóvaya Derévnya, we travelled for the first time continuously on the ice of the Irtuish, in which green boughs of pine-wood were fixed upright at equal distances. These marks are named viékhi, and serve to point out the road which has been tried.† This indispensable precaution was had recourse to here sooner than higher up the river, because there are productive fisheries at several points of this tract.

We reached the fishermen's huts of Oluimsk, at night; and about fifteen versts further on, at 9h. 40m., Tobolsk time, on the 23d November, we entered Uvàt, a considerable Russian village on the left bank of the Irtuish. Here we made our first magnetical observations in this journey. The increase of inclination, compared with that observed at Tobolsk, amounted to only a sixth of the difference of latitude; so that here again was clearly indicated a course of the isoclinal lines deviating widely from the geographical parallels. The intensity had augmented from Tobolsk about $\frac{1}{100}$. The distance from Tobolsk to this place, which we performed in seventeen hours, is reckoned 117 versts by the winter road, and 184 in summer; our course probably lay near the latter line, for our speed was never much under ten versts an hour. The wooden partitions of the peasant's cottage in Uvat, where we boiled the water for our breakfast, were remarkably clean; the vehicles also,

* The distance from Brónikovo to Karabinsk is reckoned in summer on the river at fifty-eight versts, but in winter, in a straighter line, at thirty-five.

† On the ice of the Neva also between St. Petersburg and Kronstadt, marks of a like kind (fir-boughs), bear the same name *viékhi*. This word is undoubtedly connected etymologically with *viétva* and *viétka*, a twig, and its resemblance in sound to the German *weg*, a way, is merely accidental.

and clothing of the stout peasants, whom we met on their way to church, bespoke their thriving condition. The whole looked better than any thing we had previously seen on the great Siberian road.

In the open sledge I now enjoyed more completely the changes of the route. We went straight across the Irtuish, and then up on the right bank through a narrow ravine. They called it travelling on the brook; and yet there is water in this hollow only in spring, and its bed, near the mouth, was quite free from ice. We then ran over ploughed fields, which were recognisable by the undulating surface. The snow had in many places completely hidden the inequalities of the ground; but the horses sank to their bellies, and it was only in the deep track which we left behind us, that were to be seen any signs of a travelled road. Yet the boughs of fir (viékhi) had been stuck here before the last fall of snow, and their tops projecting still served to point out the direction of the road. After fifteen versts we came to the wooden huts of Terékhina, near which stand numerous low stalls for horses and cattle. They are three quarters of a mile from the right bank of the Irtuish, on a rivulet named Turgut.

We went six versts further on the same bank, and a similar road to the village of Kosheléva, which stands on a deep inlet from the Irtuish. A row of wooden houses extends between the eastern margin of this piece of water and the steep hills enclosing it, which are adorned with tall fir-trees looking beautifully green in the midst of the snow. This and similar inlets filled from the river, are called by the Russians here Sóri, in the singular Sor, a word probably related to O'sero, a lake; but which is never used in European Russia instead of the latter term. Here, also, we heard for the first time, the expression polúinya, which was given to a broad stripe, free

from ice, along the side of the inlet.* The few strange words which distinguish the language of Siberia from that of the mother country, have all reference to natural objects; but, in general, terms and idiomatic expressions, are remarkably well preserved in the new country. It is unquestionably the attachment to the old language of the church, which is constantly kept alive, even in the remotest provinces, that checks the increase of dialectic corruptions.

Since morning the temperature of the air had continually risen with a clouded sky; large flakes of snow were now falling, and the wind breaking among the hills, occasioned a violent whirling. Nevertheless, the people of the village, active and hearty, were busily employed in the open air. A number of men were cutting holes in the ice, to let down their hooks. Others, men and women, were looking after the horses for our conveyance. They had vigorous figures and blooming faces, and we heard nothing from them but jokes and laughing exclamations. Whether from delight at the weather, or in order to find shelter from it, the drove of horses, that were running about loose, started off on a sudden past the houses, and out of the village.

We now proceeded through a thick wood of firs and Siberian cedars (Pin. cembra), mingled with stems of birch, along the right bank of the Irtuish, which is here frequently intersected by water-courses. In the village of Búrenka, on the right bank, ten miles from Kosheléva, we heard the Ostyak language for the first time. The Yamshchiki all used it in discoursing with one another. They seemed shier than usual towards travellers, for they gathered round the sledges only in distant groups, and an aged man,

* Related possibly to *polóso*, a streak; and *póluí*, empty. The same term is applied by the Siberian Russians to the remarkable open spots in the Icy Sea.

who, as he related, had formerly lived in the town as a Kosak, alone approached with loquacious affability, and plied us, as all had done hitherto, with questions and narrations. Here for the first time, we saw the windows closed with fish skins, and not as hitherto, even in the poorest village dwellings, with pieces of talc joined together. The fur frock of the Ostyaks, closed all round, with its attached hood, seemed to be now as common as the Russian kaftan. We also found here a new mode of yoking the horses, for a long trace was fastened to the end of each shaft, and within these the horses drew in a line one before the other. This is called "gúsem sapriégaty," that is, to yoke goose-wise, in contra-distinction from the hitherto usual method of setting the horses "riádom," or in a row abreast.

In the course of the evening and the night, we went partly on the river, partly on the elevated bank, and reached, one after the other, the huts of Pérshinsk, the vòlost or chief place of a circle, Yúrova (thirty versts from Kosheléva), and the village of Demyansk (twenty-eight versts from Yúrova), all on the eastern side of the Irtuish. Snow fell heavily during the first part of the evening, and the viékhi, plainly visible on the white ground, were of essential service. As it grew later, the moon shone feebly through thick clouds. The peasant in whose cleanly house we stopped while changing horses in Yúrova, asked to see our passports, as he was the Vólostnui Nachálnik, or chief officer of the circle. He then treated us hospitably with kvas, the rich flavour of which furnished evidence of good grain. Here as well as at Pérshinsk, the room was extremely well lighted by a birchen lath about four feet long. At the top of a wooden stand, about four or five feet high, for which an iron basin served as a foot, were three iron points. The lath, about two lines thick and eight wide, was, with

a little bend, fixed between the points, and lighted at the lower end. The snow-white wood, dried previously on the stove, burned with a bright flame and with little smoke; but sparks flew from it pretty often, and fell into the basin below. The same odour which distinguishes the leather prepared with birch-tar (dógot), is very observable in the houses where these laths are burned. An ample stock of laths for lighting, lies in a pile at the foot of the stand.

Before we reached Demyansk, the ground was so covered with snow, that the horses in front sank to their bellies, and we now saw the advantage of the goose-march. We halted several times during the night, on meeting long trains of sledges belonging to fish-dealers from the Obi. A quadrangular basket or kish, made of twigs, with a slanting cover, leaning backwards, rests on the sledge runners, and contains the merchandise. The indefatigable drivers trudged along on foot after the sledges, on the scarcely beaten path, while the horses were guided only by constant calling. Notwithstanding their exhausting toils, these people were not wanting in prompt drollery, for in reply to our inquiry respecting the load of the coffin-like sledge, one of them answered, that he was carrying the head-priest of Beresov, who had died of drinking too much water. A large sturgeon might, probably, have suggested the comparison that lurked in the man's answer; but at first, his asseveration shocked me not a little, for I had letters of recommendation to the worthy priest, on which I had founded great hopes.

November 24.—The sky cleared soon after midnight, but before sunrise low clouds collected again, and drove rapidly with a south-west wind. The thermometer during the whole day, did not sink below —6° R. In the little village of Tugálova (28·5 versts from Demyansk, and by the winter road 138, by that

of summer 212 miles from Tobolsk), on the right bank of the Irtuish, the magnetic dip and intensity were observed, and then we cooked our tea and fish in a Russian hut. In general, it proved very convenient, and at the same time conducive to the objects of our journey, to stop in this way in the morning to make the magnetic observations, and for breakfast, and to make a second halt at night, for the sake of the geographical determinations, and to observe the magnetic declination with the transit instrument. The geographical position of the morning stations was then, in truth, obtained only by itinerary distances from the night stations; but there was nothing better to be done, as it appeared that at this time of the year the sky was always overcast during the day.

Beyond Tugálova we travelled on the ice of the Irtuish, and saw frequently the contrivances for the most productive kind of winter-fishing, called Yúrova. Between the viékhi, always on the right and more tranquil side of the river, was a strong pole in an inclined position, and with its lower end frozen fast in the ice. At the upper end of this pole was a continuation made of switches which, bending down, reached to the surface of the ice; at that point was a hole through which was let down the hook and line. The upper part of the apparatus is seen bent down more or less, according as the bait is still untouched, or a fish pulling at it has freed a check put to the elasticity of the rod, and is thus, in consequence of its own efforts, drawn nearer to the surface of the water. To this self-acting apparatus of the winter fishery, is added a second no less ingenious contrivance. These fishing-rods are set only in those places where there are known to be muddy hollows in the bed of the river, because in these sheltered holes, the sturgeons of different kinds lie together in clusters, and quite motionless for the sake of warmth. They are to be dis-

turbed from their luxurious rest only by the excess of that which they desire, and for this purpose, hard balls of clay, heated in the fire, are thrown from time to time into the water, through holes in the ice below the bait. The sudden heat awakens the fishes, and at last drives them from their resting-place. They rise towards the ice, swimming as usual, up the stream, and so come upon the bait. The name peculiar to this promúisl, refers evidently to the ingenious mode of disturbing the fish, for yúrova is evidently derived from the expressions yúrkaty and yúrity, which are applied to a sudden swimming away, and the latter also to any anxiously quick movement.

On the lowest left bank of the Irtuish, we arrived at the Russian station Subotsk, in which was conspicuous a very snug-looking peasant's house. Small groves of birch and willow diversify in summer the plain round the village; at present there is nothing to be seen of them but groups of black, leafless stems, which look at a distance like islands rising from the sea of snow. In front of that neat house lies a kitchen-garden, distinguishable by its careful fence. At this place the water of the Irtuish spreads in spring far over the low land. The houses are often endangered by the flood, which leaves behind, however, some compensation in the fertilising sediment, on which the more industrious inhabitants obtain not less than forty-fold the seed, in wheat and rye, and derive a revenue of 700 roobles from the piece of ground cultivated by a single family. Yet the rearing of horses, fishing, hunting, and gathering the cedar-nuts in the woods on the right bank, constitute the chief employments of the Russians. Many of them discharge their obligation to the state by doing duty as Yamshchiki, in carrying the post; others, as we were told in Subotsk, by a yearly poll-tax of fifty roobles. This amount in itself is not too high, but it is

felt to be oppressive, that for want of an annual census, the communities continue long to pay for the deceased.*

The route went now along the left bank, but about 3h. 30m. in the afternoon, we crossed the ice close by an island in the middle of the Irtuish, and ascended the right bank till we came on some hills, bounded on the one side by the broad river, on the other by a lateral branch or inlet connected with it. On these hills, and on the slope towards the inlet, lies the chief village of the circle, Denjikóvo, at the entrance of which, the peasant invested with the dignity of Golovà or chieftain (literally, head), met and welcomed us. He seated himself like a guard of honour on the wing-like appendage (the otvódi) of our sledge, and in this way conducted us to one of the Russian houses of the place, the population of which consists in a great measure of Ostyak families.

Among the Ostyak women here, we first saw the strange custom of veiling. Two women in an open and single-horse sledge, met us shortly before we reached the village; one of them had a long cloth over her head, that covered her down to the shoulders of her fur dress; the other had a similar veil, but raised moderately, so that she could see a short distance before her to drive the horse. She did not perceive our sledge till we came close beside them; the other, however, was not excited to look out either by her own curiosity or by our loud greetings. Yet she was not by any means asleep, but

* This complaint was so frequently repeated to us afterwards in different parts of Siberia, in reference as well to the money-taxes of the Russians, as to the fur tribute or yasak of the indigenous tribes, that it would lead us to infer a general decrease of the population, if we did not bear in mind that in this as in other similar cases, the positive hardships alone fix attention; the exemptions pass without notice. In Western Siberia (the governments of Tobolsk and Tomsk, and the province of Omsk), the male population amounted in 1796, to 390,500; in 1816, to 502,100; and in 1829, to 527,600.

talked with much animation to the driver. In accosting them, as well as in reply to our questions respecting these women, our guides (the Kosak and the Yamshchiki) acquainted with the Ostyak language, called them *ánki*, which they explained by the Russian, *khozyáika*, matron. They stated expressly, that among the Ostyaks at this place, the unmarried and married women alike wear the veil.

The clouds dispersed, the sky was clear, and about 4 h. 30 m. in the afternoon the polar star was quite visible to the naked eye. The astronomical observations above stated were made here with complete success. During these operations, and but a few paces from the spot where my instrument stood, the woodwork inside of a bath-room (bánya) caught fire, and we were soon deserted by some troublesome spectators. They ran to assist those who were hurrying out of the bath; and so actively were masses of snow carried or thrown in through the door of the burning hut, that in a few minutes the flames were extinguished.

With a very moderate share of prosperity, the houses of the Russians in Denjikóvo are characterised by cleanliness and good order, which are altogether the merits of their wives. In this we found confirmed, what rumour in Tobolsk had already stated of the Russian women in the north, for they were all distinguished by healthy and very pleasing looks and figures, by neatness of dress, and by hospitality. They treated us with crucian (Cyprinus carassius), which they told us was to be had constantly only in this place. "These fish live only in standing or slowly flowing waters; and, therefore, they are not to be found in the Irtuish, but only in its lateral expansions, which sometimes take the form of sóri, sometimes, as here at Denjikóvo, that of Protòk." This last expression, too, though not so exclusively

Siberian as the above-mentioned name for the lake-like branches of the Irtuish and the Obi, yet is here employed in a new and peculiar acceptation. For the European-Russians use the term but seldom, and then very arbitrarily, but generally to signify a small rivulet with a spring of its own; whereas, here, it always means the branches extending into the land from the main stream, and then, after a long and separate course, joining it again; or else becoming stagnant, like the small Sóri. The etymology of the name corresponds very well with this meaning, for the root, protéchi, involves the idea of a lateral penetration or flowing in.

Besides the excellent fish, there was another dainty, which agreeably surprised us in this wintry spot; this was the glúkva-berry (Vaccinium oxycoccus), which is kept in summer in ice-cellars, but at this season needs no peculiar care. In shape and colour these berries were fresh and unaltered; but in the interior of the pulp, minute flakes of ice traversed a fluid remnant of the juice, which was capable of resisting the freezing influence of a much lower temperature.

The moon had already risen when we left Denjikóvo. Our goose-march team now went at full gallop over the ice of the protók already alluded to. This lies between hills of loose mould, with steep slopes, and most picturesquely crowned on their summits with firs and stone-pines. There was bright moonlight on half only of the snowy ground, for the long shadows of the hills and high woods stretched far across the road from the right. We frequently passed over places, where, sheltered by the hills, the ice had remained quite free from snow, and then, on a sudden, we heard the ringing of our horses' hoofs. But still more singular was the sound in these wintry solitudes, of the loud calls reciprocally exchanged between our driver, who held the reins of

the shaft-horse, and the riders of the other horses. As if they screamed through instinct, or, as if they rode only to scream, the uproar continued without interruption till they finished their stage, for in the measured trio, each was silent till the man before him had concluded. From the Ostyak riders is to be heard in general only a loud and prolonged *kúda!* (whither!) as a scolding interrogatory to the horses; whereas the more eloquent Russians on the sledges pour out, from time to time, their national and elaborate exhortations.

The whole night long there appeared on the dark-blue sky a white arch, which remained in a totally unchanged position with respect to terrestrial objects. Its concave side was towards the horizon; its highest point had an altitude of 22° 5′, and lay N. 19° 2′ W. Above it were fragments of arches, whitish or of faint light, lying parallel to the first, but separated from it, and from one another, by blue spaces. Totally and obviously distinct from this phenomenon, but visible at the same time with it, was a ring or halo round the moon, formed by the refraction of its light, and accompanying that luminary in its movement through the heavens. This ring intersected, or, to speak more correctly, covered a portion of the fixed arch at its western side, and towards the horizon. It also was quite colourless, and of uniform brightness throughout, as well at the places of intersection, as where it was projected on the blue sky. The light of the immoveable arch was fainter than that of the halo, but increased to the intensity of the latter on the lines where the interference took place, and this contributed to make the halo appear uninterrupted, and defined throughout with uniform sharpness. About 10h. 30m., as the moon stood about 83° 2′ of a great circle from the highest point of the innermost fixed arch, a portion of the halo lay a few degrees west of

that point, so that the apparent semi-diameter of the halo could not be less than from 85° to 90° of a great circle.*

The first-mentioned arches of faint light were sufficiently distinguished by their unchangeable form and complete immobility, from ordinary clouds, as well as from optical paraselenæ; and there was no alternative but to consider them as an aurora. The phenomena described, at the coincidence of the halo and the luminous stripes, prove satisfactorily that the strata of air in which the refraction of the moon's light took place, was nearer to the spectator than the luminous matter of the fixed arches. It must also be remarked, that the vertex of this aurora did not by any means lie in the plane of the magnetic meridian of the place, but rather some 30° west of it. Here, too, the country is well peopled, for we saw three Russian-Ostyak hamlets on a line of only thirty-five versts.

November 25. — The last of these places, the yurts of Tsuingalsk on the left bank, was reached by us while it was still dark, and we did not make

* It is an obvious objection to Huygens's theory of haloes, which assumes the existence in the atmosphere of globules of ice, each formed round an opaque particle of snow, that according to it, rings of all sizes, from 0° to 80° 28′ apparent semidiameter, are equally likely to occur: for if the opaque nucleus be assumed at every dimension from 0 to 0·7634 of the semidiameter of the whole globule in succession, we shall have for each of these conditions a ring of a determinate magnitude. To say nothing of the improbability of the assumption, that in all the globules, the opaque portion bears the same proportion to the whole, it is impossible to account by this theory for the predominating frequency of haloes of 22° semidiameter, which supposes the magnitude of the snowy nucleus to be 0·48. Equally inexplicable is the appearance of a ring, such as we observed, between 80° 28′ and 138° in radius; for according to Huygens, the first of these dimensions is the greatest limit of haloes produced by refraction; the second the lowest limit of those resulting from refraction and reflection. That haloes may be formed by spiculæ of ice, the lateral surfaces of which have a uniform inclination, was perceived by Mariotte, Venturi, Fraunhofer, &c. With the sides inclined at 60°, a halo may be formed having a radius of 87°.

the usual morning observations till we had arrived at the yurts of Savodinsk, fourteen versts further on. The Ostyaks here have learned from their Russian neighbours to build good wooden houses; for wooden stairs and landing places, from six to eight feet high, on the outside of the houses, and partitions dividing them within into two chambers (isbà and górnitsa), and well-built stoves (péchi), are to be seen here just as in the Russian villages. The fishing-nets that were hanging up, made of nettle bast, sufficiently indicated the chief employment of the inhabitants. The clothing of both sexes had the whimsical mixture which is not unfrequently seen in border districts; the same individual being dressed half in the Russian, half in the original Ostyak fashion. All the men knew some Russian words, but employed them with little skill, and pronounced them abominably.

We arrived, after a two hours' journey, at the stage of Repólovo, which is also on the left bank, twenty versts N. W. from the Savodian yurts. The road went over a low tract, and through thick woods of alders, willows, and poplars. The stems of the latter reached a height of fifteen or twenty feet. A variety of humbler plants among the trees were so well preserved in form, by the rapid setting in of the frost that killed them, as to be easily recognised. A large epilobium, and a heracleum, of a man's height, and determinable from the seed, were chiefly conspicuous. One of the Ostyak drivers of our sledge amused himself at times, while travelling, with a song, the words of which, at my desire, he gave as follows: —

"Inga tórum — véchyukh
Pórtópópi kéna
Séredíshne konshratei
Yángsangtóge ei ponamar
Shálevóyanne podarite
Ogelgan enkidite. —
Inga tórum véchyukh
Khútom baorpídat (mishósem ?)"

About 1 h. 30 m. we reached Repólovo, which lies on the left bank between hills, on a marshy flat, often inundated. Here Ostyak manners predominate more than in Savódinsk. The houses differ from those of the latter place in being smaller, and in having the door-sill always laid on the bare ground; the windows are all glazed with fish skins. The only skin used for this purpose is that of the eel (*Russ.* nalùim, *Gadus lota*), which is here extremely abundant. During the summer, many articles of dress are made of the skin. The fish itself is not much eaten, either because the river supplies a superabundance of other and better food, or because the eels here lose, by their annual return to the sea, the qualities which make the kindred species in the lakes of Europe so acceptable. The windows of nalùim skin are rubbed with the fat of the fish, to make them more transparent; yet there are small, roundish swellings in the skin, like scales, but translucent, and about a line asunder, which refract and confound the parallel rays of light. The effect resembles that of the lens-like pieces of glass, which, in old German buildings, used to be joined to form panes.

The huts in Repólovo were remarkably empty; and we were told that most of the Ostyak men had gone this very day on a fishing expedition, and that their wives were keeping a feast in the kabàk, or public-house of the place. As we stated with respect to St. Petersburg, so in all other parts of European and Asiatic Russia, brandy is to be had only in houses appointed for the purpose (kabàki), and from the contractors (*otkúpchiki*, buyers-up; from *kupity*, to buy), who are accountable to the government.* We

* In European Russia there are contractors and licensed houses of this kind in every considerable village; and in the popular poetry, the *Tsarskí Kabàk*, or imperial pleasure house, is often mentioned. In Western Siberia they are fewer, yet we were informed that a chief farmer of this

found in the dark room, hardly ten paces wide, of the public-house and place of revelry here, a European Russian, probably banished in former years, busy behind his counter; and, besides him, only the Ostyak women. Ten or twelve of them were assembled, and the brandy had already taken effect upon them all,—in a way, however, not at all offensive to an even-tempered spectator. A number of short and corpulent figures, with black, sparkling eyes, rather oblique, could be just seen, moving and mingling together, in the narrow space. They all talked with animation, and with remarkably delicate voices, which now gave expression only to soft and joyous emotions. They embraced, one after another, the Yamshchiki who entered with us; and their soft voices, now almost whining, seemed attuned, not so much to words of old acquaintance, as to the endearments of young and growing love. They all wore frocks, or shirt-like garments of nettle-cloth, which were ornamented, exactly like the dress of the Mordvi women, with embroidery in red and black, round the neck and breast. None of them was without the head-dress, shaped as a cross, which serves them for a veil; but they had raised up the front part of it, and thrown it back completely over the head. We could perceive that, under the circumstances here described, and in other cases subsequently witnessed, this departure from the prevailing custom was not considered as in any degree irregular or improper.

The very trifling means of the women were soon exhausted, while the pleasure of drinking had but just risen to its highest pitch. My promise, therefore, to pay the scot for the rest of their indulgence

monopoly in Yekaterinburg, derived a daily profit of 1000 roobles from the sale of brandy. In the northern part of the government of Tobolsk, the sale of brandy beyond the privileged places is strictly prohibited.

was received with the greatest thankfulness. But they now took especial pains to show themselves deserving of the European treat, by good Christian observance; for at every glass they took, they came up to us, and, before they tasted the dram, crossed themselves with a most singular and laughable gravity. Devout Russians are in the habit of neutralising the Satanic operation of spirituous liquors by a rapid movement of the right hand, intended to describe the cross, or by a softly ejaculated prayer, or merely by blowing the breath on the glass. But the good-humoured Ostyaks, who were novices in both arts, of Christian prayer as well as of drinking, were desirous of providing against the infirmities of the flesh by some more ample religious ceremony; and so they made the sign of the cross to such an extent, so slowly and with such deep bowing of the body, as would be required by the church only on the most solemn occasions.

In this place not a soul understood a word of Russian; and so, not to remain quite mute in the midst of the northern Bacchantes, I recited the first of the Ostyak verses which I had learned. This was immediately caught up with the greatest glee, and passed from mouth to mouth: the whole ballad was afterwards sung, just as I have given it.*

The Yamshchik who was conducting us — an old Russian of Repólovo — told me, respecting the Ostyaks of the latter place, that they begin every new period of the fishery, or of any other promuisl, not only

* I am more careful to mention this confirmation of the orthographical correctness of my Ostyak text, as its whole value depended thereupon. It appears that the song in question was known only in this tract and not lower down the Obi, and that it is composed in a dialect which differs so widely from what is spoken here, as to be quite unintelligible to Russians well acquainted with the latter. Perhaps the people here have borrowed it from their neighbours in the west, the Voguls and Votyaks.

with a carousal such as we witnessed to-day, but with a sacrifice according to ancient usage. Those who are going out on the expedition kill a tame animal, and besmear their faces with its blood.* This sacrifice does not take place, however, in spots consecrated for that purpose; but every one performs the rites with his own family, and in his own hut. Notwithstanding their obstinate adherence in this particular to their old religious notions, according to which their industry is at one time aided, at another mischievously obstructed, by the divine power, the Ostyaks of Repólovo are accustomed to go to the Christian church once every year after Christmas. But it is probable that they are not much edified there; for our Russian informant complained bitterly of the priest in his neighbourhood, who came into the villages on holydays so drunk that the congregations assembled to no purpose.

The tract now travelled over (from Repólovo to Samárovo, eighty versts) is frequented by rein-deer and elks (in Russian, oléni and lósi) from the north during the spring only; and doubtless they are then attracted by the budding of the leafy wood, which is here to be seen along the left bank of the Irtuish, and in the deeper ravines of the right bank. Such depressions in the elevated bank are here very frequent, and often allowed us to leave or to return to the ice of the river. These changes in the direction of the route, however, were not effected without some difficulty; for as there were not people enough at the stages to-day to enable us to have a rider for each horse, while at the same time the Ostyaks are but indifferently skilled in the management of long reins,

* Lower down the river, rein-deer alone are used for this purpose. But the Ostyaks at this place are obliged to buy the animals for their sacrifices, whether rein-deer from their neighbours towards the west or north; or a horse or cow from the Russians.

it happened to us not unfrequently that our leading horse wheeled round upon the sledge, and faced the driver of the second horse. Though less docile than dogs, the horses here are dealt with on the same principle as the latter; that is to say, they are driven and guided wholly by words.

The festival of to-day, at the beginning of the ice-fishery, seems to be generally observed in this district; for in the village of Basiansk, twenty-five versts from Repólovo, we found the Ostyaks all drunk. They pressed with unusual eagerness round the instruments which I was setting up for the geographical observations; and as the Kosak endeavoured to keep them back, one of them said to him, in broken Russian, "We are used to see you treating the Ostyaks like dogs, while you are always praising the Russians." Our labours were soon put a stop to by the clouds, which concealed the stars very soon after they first became visible. To-day we had, with a south wind and clouded sky, remarkably mild weather; and about two in the afternoon the temperature of the air was —2° R.*

About an hour after midnight we arrived at Samárovo. This place is distinguished for its advantageous position, near where the Irtuish joins the Obi, and is more noted than any of the settlements which we had seen as yet since we left Tobolsk. We staid for the night in the house of a Russian, who announced to us, not without some pride, his rank of burgher.

November 26. — About eight o'clock in the morning, the first glimmering of twilight made its way

* It was the same in Tobolsk on this day, as I afterwards learned from Professor Hansteen. But the anomalous increase of temperature extended also to Beresov, for there was mild weather in that place for a week from the 24th of November, with a south wind, although the temperature of the air had previously sunk to —24° R.

through the fish-skin window of my apartment. The sun rose at 8 h. 54 m.; the astronomical twilight must have commenced, therefore, at 7 h. 29 m. The houses of Samárovo are scattered irregularly, but picturesquely, over a low and undulating piece of ground, which is encompassed on the north and north-east by hilly slopes of considerable height, while towards the west it borders on the Irtuish. In the middle of the place a ravine, at this time entirely filled with snow, is crossed by a wooden bridge. In the summer, the brook Samárovka, which rises at some distance in the hills east of the place, flows through it.

A large wooden house in the middle of the village contains a store of flour and salt, for the supplies to be furnished to the officers and Kosaks in the circle of Beresov, which, under the meridian of the Irtuish, extends as far south as Samárovo. On the western slope of the hill, towards the north, is seen a church of wood. The steep bank of loose soil on which it stands often gives way towards the river, and the edifice itself seems to be on the brink of ruin. A heap of new bricks announced the preparations made for building a new church in the plain. The wooded surface of the hills lies at the same height here as at Tobolsk; but with respect to the elevated plain, it is visibly interrupted towards the north by a broad valley. The northern declivity of the hills extends from the Irtuish, near Samárovo, a long way to the east. Towards the north it is succeeded by the valley of the Obi, six miles wide; and beyond this river is seen rising a second ridge of hills, parallel to that of Samárovo.

For the first time since I left the Ural, I now found blocks of stone. They were lying at the foot of the hill turned toward the Irtuish, and were of greenstone, partly with crystals of hornblend formed in it; partly with shining feldspath, in an amorphous mass;

white quartz, coarse or fine-grained, with wood-asbestus, and fine scales of chlorite; crooked and coarsely-splitting masses of diallage and talc; and finally, a greenish-white mica slate, with a very fine layer of quartz. The blocks here did not exceed from two to three cubic feet in size. They lie on the gentle slope at the foot of the hill, only where it is reached by the river-floods, but not higher up on the steeper part of the bank. From the situation of these masses, on the ridge which projects like a spur at once into the valleys of the Irtuish and the Obi, it might be doubted whether they do not come from the latter into the former, arriving from the north-western outskirts of the Altai, or whether they rather come from the Ural. The latter supposition, however, seems more likely, particularly as rocks closely related to those just enumerated are known to exist at various points of the Northern Ural. But that the rolled stones should be found exclusively from this place towards the north, and not southwards, towards Tobolsk, is a sufficient indication that the mountain flanks of the Ural lie nearer to the Irtuish here than at Tobolsk.

The highly favourable situation of this place did not escape the notice of the Ostyaks in old times. Towards the end of the sixteenth century, as the Kosak Bogdàn, starting from the Sibir of that day (the present Tobolsk), went northwards exploring, and propagating Russian customs, he found at the junction of the two rivers, a flourishing Ostyak settlement, under a chief named Samàr, who acknowledged himself tributary to Tatar princes. The place had also some religious importance, for here alone there was an idol, representing a female, which was worshipped by the Ostyaks. European settlers soon began to fix their abode in the place, living in peaceful union with its original possessors, and they gave their new colony its present name, in honour of the

Ostyak ruler whom they first found there. Until 1630, the Ostyak population still continued predominant in numbers; but about that time, they themselves begged for a supply of Europeans more capable than themselves of driving horses and discharging the various duties of the post, which had now grown more urgent by the extension of the Russian settlements to Beresov. Accordingly, Demyansk and Samárovo were in the first place peopled with Yamshchiki, and the Ostyaks diligently avoid the chief post-stages.

The descendants of those first Russian settlers now thankfully acknowledge all the advantages which they derive from the well-chosen situation of their village. The hills, which adorn the landscape, send down also some lively rivulets to the place, and shelter it from the north winds. The fine timber, the cedar-nuts, the neighbouring woods, well stocked with squirrels (bielki), and foxes (lisitsi), are all warmly praised by the inhabitants. The deer, mentioned above, are killed here only in the spring; but the fisheries are not so limited, and in this occupation the new settlers in Samárovo have acquired all the dexterity and aptitude of their predecessors. The navigable river, and the post-stages during the winter, facilitate their commercial intercourse with their kindred and friends in Beresov, in Surgut, and in Yeniseisk. The resources of China also flow hither unhindered, and our host set before us good tea of his own, as well as a samavar.

Having finished our magnetical observations, we left Samárovo about ten o'clock in the forenoon, and in about two hours arrived at the village of Bielogórye, on the western margin of the Obi; which, divided into two arms, has already taken a northerly direction. The Irtuish is crossed at Samárovo, and the traveller goes along the low, left bank of a western branch, called Berésovski Protòk, or the Birch

River, and which still retains its name, even where the right branch of the river has already united with the Obi.

Bielogórye is inhabited by Russian carriers and fishermen. We there entered a small room, heated like a vapour bath, and yet six or eight persons were lying on the still warmer paláta, and descended from time to time only to take a draught of kvas, which was kept as cool as ice in one corner of the room. The fermenting grain lies at the bottom of a great wooden tun, near this stands another vessel filled with melting ice, from which every one pours into the tun as much fluid as he has drawn from it. This kvas is an agreeable drink to those in health; but some people here, who were suffering under a slow and obstinate fever, manifested the strongest repugnance to it, though it was the only cooling drink that could be offered to them. The Siberians are so much attached to the belief that any nutriment of an unusual kind must be much more salutary than indigestible medicines, that a bottle of English porter, which I left behind for the sick, was hailed at once as an infallible remedy. At the same time that we arrived at Bielogórye, the sledge of a fish-dealer from the north also entered the village. It was constructed like the fish-sledge already described, and was heavily laden with Nelm-salmon and sturgeons as long as a man. The fish were thrown one upon the other in the basket or chest made of switches, and their preservation was thought sufficiently secured by the frost.

Besides the two chief arms into which the Obi is divided below Bielogórye, there are, on the left side of the river also, several smaller sóri and protòki. These lateral openings represent the places where the tributary streams, coming from the west, enter the Obi. Our drivers related how these channels,

completely smoothed over and concealed with ice and snow, often become suddenly filled in spring with running water, so that those who are travelling in sledges along their banks, find it impossible either to advance or retreat, and are confined to the little islands for days together. These accidents are manifestly analogous to those which I subsequently heard of on the confluents of the Lena, where they are known by the name of nakipity, that is, the springing or boiling over. They are the streams from the springs in the western mountains (the Ural), which, even after their arrival at the Obi, have warmth enough to keep the ice thin where the waters meet, so that it breaks very early in the season.

About sixty-two versts beyond Samárovo, on the great island between the two branches of the Obi, we came, about ten in the evening, to the settlement of Yelisárovo, where we succeeded in getting a geographical observation. We were surprised here at the sight of a very opulent-looking farm-house, the owner of which invited us in, with the usual expressions, to warm ourselves. The two stories of the house were higher than is usual even in Russian towns, and each of them contained several rooms of considerable size. Contrary to the prevailing custom, the stairs were inside of the house. In all the rooms, the roundish surfaces of the beams or logs were covered with boards planed smooth, while the benches at the sides, the tables, and the other furniture were all made of clean and glossy fir-wood. One wall of the chief room in the upper story, was entirely covered with richly ornamented holy images (obrasa), before which were hanging vessels of incense (kadílní), and votive tapers were burning without number. The windows were formed of large plates of fine glass, the panes being set double in

frames about an inch thick, as may be seen in the houses of the wealthier inhabitants of Tobolsk.

Although it was night, we were not allowed to go hence without a good meal, and while the women were getting it ready, the well-satisfied owner of the house descanted on his rare good fortune. He had laid out the immense sum of 3000 roobles in building his grand house, and for the rest trusted to the river, to which he owed all his opulence. In summer and winter the excellent fishery here was raised in value, as our host expressed it, by the proximity of the town. The distance to Tobolsk, nevertheless, is reckoned at 306 miles in winter, and 372 in summer, but the travel-loving Siberians measure proximity by a standard very different from the European. There is no want of active horses in Yelisárovo, but the inhabitants of the place have made no attempt at agriculture, being fearful of withdrawing labour from the fisheries.

We travelled during the night on the ice of the eastern half of the Obi. The island which extends about a hundred versts between the two halves of the river, has in general, a steep bank, about eighty feet high, towards the east. It rose on the left close to our route, while the ordinary elevated bank appeared on the right at a greater distance. The island seemed to be a piece broken off from the latter; and should the western branch of the river here be ever completely dried up, then we should see the Obi flowing quite anomalously in this part of its course, between two elevated banks. *

* In like manner, no doubt, may be explained the two elevated banks of the Irtuish at Tsuingalinsk, the only instance of such an appearance on that river; and there, too, may be seen towards the west, the traces of the ancient bed of the river. The water of the Obi, owing to its greater purity, can long maintain its double channels, and flow for years between islands; but the Irtuish, more loaded with sediment, soon fills up the old beds when new ones are opened.

The inhabited places along this island, are invariably situate on the very edge of the eastern steep, so as to be close to the river; and yet secure from inundation. We first reached, about twenty versts beyond Yelisárovo, three or four Ostyak yurts, called by the Russians, Sukhorúkovski pogòst, that is to say, the place of entertainment on the dry arm (of the river).* The bank here rises abruptly to the dwellings; it was necessary, therefore, to leave the sledge on the ice, and to call from below for fresh horses. A well-beaten footpath conducted us to the nearest yurt. The small cubic building scarcely rose above the snow, but the sparks that crackled and flew over its flat roof, showed its position from a distance, and also exhibited the difference between an Ostyak and a Russian habitation, for no unconsumed particles of wood ever rise from the spacious stoves (péchi) of the latter.

Stooping through the door, we entered the hut, the floor of which was a good deal lower than the surrounding ground. Opposite to the entrance was burning a brisk fire, on a raised hearth of clay, in which, in accordance with the Vogul and Tatar custom, an iron pot was sunk. The fire required to heat this lay deeper than that which warmed the room. The hearth and fire-place occupying a width of four feet, reached nearly to the wooden wall of the building, which was protected from the flames by a layer of clay a foot thick. A cylindrical flue of the same material connected with the back of the hearth, rises perpendicularly to the roof. The flue is about a foot and a half wide, but enlarged to three feet immediately above the fire. Some broken places in this piece of work, allowed us to see how it was con-

* This name probably refers to the former dryness of the right branch of the river, but in this case it must have been originally Sukhorúkavski.

trived, and on this subject we received ample information in the yurts which we subsequently visited. A frame work of rods and twigs, cylindrically shaped, is plastered over with soft clay. The name of chubàl given by the Siberians to these Ostyak fire-places, is unknown in European Russia, and is of Tatar origin: the Tatars of Tobolsk still use the word Tsuval in the same sense. Round the rest of the room, towards the walls, the floor was raised for a width of about six feet, and on this elevated part, the inmates slept at night, and sat at work by day. From comparison with the side benches of a Russian peasant's house, these parts of the yurts are improperly called by the Siberian Russians, lávki or lávochki. A heap of laths for lights, and some fishing gear (baskets of all sizes) formed the chief furniture of the yurt. The people unemployed, sit on low stools, about a foot high, directly opposite to the fire, to enjoy more perfectly the effect of the flames, and when a stranger enters, half frozen, a place is sure to be good-naturedly offered to him in front of the fire.

The yurt was now inhabited by only one family, of which the wife and four children staid upon the raised floor next the walls. The parents wore furs, but the only covering of the children was the patched summer clothing of nettle-bast. Two Russian peasants, guests like ourselves, were seated at the fire, telling their plans of buying fish from the Ostyaks, and travelling with it to Tobolsk. They laughed a good deal at our inconsiderately asking for kvas, for even when the Ostyaks happen to get meal from the Russians, they never use it to make that beverage. On the other hand, they refer the thirsty to a vessel of river water in the corner of the yurt. In the ice of the Obi, just where the path led up to the dwellings, were cut a row of narrow openings, like troughs,

to which our horses were led to drink on their arrival. None of these openings was above six inches wide, being made narrow evidently with a view to the safety of passers-by.

November 27. — About sunrise we arrived at an Ostyak hamlet, which was named Keváshinsk. This also lay on the left bank of the eastern half of the Obi: it was reckoned to be 112 versts (75 miles) from Samárovo. Here we saw for the first time the aboriginal manners retained in perfect purity, and a degree of comfort which, in all the Ostyak dwellings hitherto seen, seemed to have been lost through a vain effort to approximate to the Russian mode of living. Ten yurts, of square form, with flat roofs, heaped up high with earth, lay irregularly distributed along an even ledge of the eastern and, here, terrace-shaped slope of the great island. The leafy bushes between the oddly-shaped huts must give the place an extremely cheerful look in summer. At present its chief ornaments were the handsome dogs. This was the first place where we found dogs constantly used for draught. They evinced curiosity, but no hostility; and came to meet us in troops without barking, to a short distance from the yurts. They were all of the height of European spaniels, but were much slenderer than these, and leaner in the flanks. They were generally white, but with ears black, quick, erect, and as sharply pointed as the obtuseness of their form permitted. The head is long and sharp, with the jaws and muzzle strong, as in wolves. The hair on the body was short, but it hung down at great length from the tail, which they carried handsomely curved upwards. Great agility in their movements added to the handsome appearance of these dogs.

The yurt at which we alighted, and where we prepared our instruments for magnetical observations,

was occupied by two brothers, with their numerous families.* The wives and children sat on the raised platforms already described, which were here divided by partitions reaching to the roof, into a number of separate chambers. These were all open towards the middle of the yurt, so as to receive the warmth from the chubàl; and, indeed, the partitions all pointed to the fire, so that however they may have failed in dividing the room symmetrically, they never intercepted any portion of the heat. A number of men came in from the neighbouring yurts to visit us, and, either through the interpreter or in broken Russian, they offered us a hearty welcome.

In the furniture of the house, as well as the men's clothing, there was much here which seemed to indicate that the people were engaged in the chace as well as the fishery. This conjecture was soon confirmed. The thick woods of the neighbourhood abound in the better kinds of fur animals, so that every one gets, without much trouble, the two sable skins required from each family, as yasàk or tribute to the Russians; and it is seldom found necessary to pay an equivalent in other skins. Our host showed us a fine sable skin got already this very winter, which he kept in a strong box, like a treasure, concealed in a corner of the yurt. The value of this skin was diminished by a bright, almost yellow, colour of the fur, which the people ascribed to the circumstance

* The magnetic instruments were packed in pieces in different cases, and were put together, in the morning generally in the nearest dwelling, at night in the open air where we made our observations; hence the observations cost more time in the morning than in the evening, for the instruments when brought from the sledge into the dwelling, were immediately covered with a thick rime, which it took some time to clear away by thorough warming. This rime was much less abundant in the Ostyak yurts than in the Russian isbi, which proves how much more perfectly the latter are warmed. The draught of air through the yurts contributes to their dryness.

of the animal living in a wood where there was too much light. There was much anxiety evinced respecting the hunting and trapping of this year, as a fire in the woods had driven the sables away from the Kevashian yurts. Accidents of this kind are unfortunately not rare on the banks of the Obi; for of the superb pine forests, which constitute at once the ornament and riches of the place, tracts of from thirty to forty miles have been often seen on fire in summer. The Russians living here attribute these conflagrations to lightning, and the friction of trees rubbing together as they are agitated by the wind. Yet it is not improbable that the mischief is often caused by the fires of wandering hunters; and that the hand of man first propagates the destructive element, of which it is afterwards unable to check the progress. Nothing stops the fire in such cases but a good fall of rain; but, in the mean time, the desolation which it has produced is total and irremediable. In the burnt woods there spring up, in place of the majestic stone pines, only birches and aspens.

It is undeniable, though the fact can hardly be reckoned among the natural phenomena representing the original course of things, that, from the first movement here of human industry, there has been going forward a continual process of destruction, without any means of restoration. Yet the extent of uninjured forest in this part of the world is still far too predominant, and the destruction of the woods comparatively too insignificant, to allow the hunting tribes of Siberia to fear for their existence on this score, and without the interference of extraneous causes. It is much more likely that in Northern Asia, in order to transform by extinction the rude aboriginal races, and to prove the perfectibility of mankind, Christian brandy must be called in to the aid of the comparatively feeble conflagrations. Al-

though the efficacy of brandy in changing the people and the aspect of the country is, here on the Obi, a good deal checked by the wise foresight of the government, yet we saw exemplified to-day the impossibility of its total suppression. Our host in Kevashinsk, a vigorous man, of noble carriage, offered our Kosak, in a tone of feminine entreaty, three squirrel skins for a dram of brandy. They told us that their woods abounded in ermines and squirrels; but that the Russians buy only the white winter-skins, and of these the yurt at present contained only the three that were offered with so much levity.

Besides the animals here mentioned, they enumerated also, as objects of their pursuit, the reindeer in the spring; a variety of foxes the whole year round; the glutton (Meles gulo, *Pall.*; rossomákha, *Russ.*), and the elk (Cervus alce). To my questions respecting the enmity said to exist between the two latter animals, they replied by relating the particulars of the story current in Europe,—how the glutton springs from a tree on the elk's neck, and kills the latter before relinquishing its hold. Yet no one could say that he had ever seen such a struggle; but, with the words, "Our old people say the same thing," they referred for ocular testimony to the dead.* These families of hunters were very advantageously distinguished from those hitherto seen, and also from the people living northwards as far as Beresov, by their good reindeer-skin clothing. It is not till we reach the southern borders of the circle within which the reindeer is tamed, that we see a suitable kind of winter clothing in general use, and the nettle-bast and fish-skin substitutes become quite subordinate.

They showed us here their ordinary hunting wea-

* The Russians buy elk-skins eagerly; but we found only a small stock of this peltry in Tobolsk.

pons. These were bows six feet long, which, while unstrung, were but slightly curved, and the circular section of which, in the middle, had a diameter of an inch and a quarter or an inch and a half. Subsequently, on breaking one of these bows, I fully convinced myself of their being made, as the people assured us, by joining with fish-glue a flexible slip of birch to a harder kind of pine-wood, the former being turned outwards; but the surface is smoothed so carefully, and covered so uniformly with colouring matter, that it is impossible to detect the joint. The arrows are four feet long, made of hard wood, and feathered finely, in two lines, at the end towards the string. The arrow-head is sometimes a large and flattened double ball, sometimes a rough, rudely-fashioned, lozenge-shaped piece of iron, the hinder part of which is driven into the shaft and tied to it, yet so as to be more easily separable from it than from any wooden mark at which it may be shot. Sables and squirrels are killed with the blunt arrows, so that the skins may remain uninjured; the iron-headed arrows are capable of piercing any of the quadrupeds of this country. To draw these bows requires not only much practice and strength, but the archer must take good care also to protect his left hand from the blow of the string.*

I was much surprised at the asseveration, that none of the bows shown to us here were made at Kevashinsk, and that no one in this place knew how to prepare these important weapons. "We buy them," it was declared on all hands, "from the Kasuimskian people." These are also Ostyaks, but superior in the

* On my return from Obdorsk I obtained a couple of these excellent bows, but, neglecting the last-mentioned and indispensable precaution, I was never able to draw them more than a third of the arrow's length; yet the iron point entered a deal board to the depth of six lines.

arts to the people here, who always speak of them with much respect. They come from the east, it is said, with rein-deer sledges, towards the end of winter, and exchange their inimitable bows and other accoutrements for dried fish, and probably, some Russian articles. The cost of a complete hunting equipment purchased of the Kasuimskie, was here estimated at two roobles, or about a third of the annual tribute or yasàk.

The pleasure of my first excursion in a dog sledge, I owed also to my host at Kevashinsk. At the door of his yurt were lying a number of these sledges, which are here made without any ornament, and with very little art. They resemble exactly the sledges used by German fishermen on the ice of the rivers, and are about three feet long with half that height and width. The wooden runners, which are three or four inches wide, are joined at both ends by yokes. Upon these are placed some boards parallel to the runners, and on those boards reclines the traveller, in a somewhat crouching attitude, his body bent forward and resting on his elbows; his feet turned sideways, and bearing against the runners. The traces are fastened to an arched piece of wood joining the fore-end of the runners. The dogs, at their master's call, approached with instantaneous obedience, yet with visible unwillingness, to be yoked. Lifting up the dog's hind legs they drew over him a girth made of skin, forcing it over his tail, until it came to the loins and small of the back, where it fitted tightly. At the bottom of the girth was fastened a loop. The same operation being performed on a second dog, the loops on the girths were fastened to traces about two feet long, which, passing between the dogs' hind legs, were attached at their other ends to the arched piece of wood above the runners. The dogs when once yoked, were restless, and howled till the

moment of departure, with their eyes turned upon the driver. The cry, puìr púir, set them at once in motion. At first, bounding and hasty trot alternated, the dogs all howling together, even the mere lookers on lending their voices, till the sledge was at last got into uniform and rapid motion. They then trotted evenly, and obeyed punctually the word of command, which was called out by the Ostyaks from behind. *Tìll tìll* means turn to the right; *bùt tìll*, to the left; and *tsàs* brings them at once to a dead stop.

The snow-shoes of the Ostyaks at this place, perfectly resemble those used in European Russia. Each foot rests on the middle of a board about six inches wide, and five or six feet long, which is curved so as to be moderately convex towards the ground, and runs to a point at each end. It is necessary to move the feet perfectly parallel to each other, otherwise the ends of the boards would knock together, and throw the wearer down. This contrivance is called *lúija* here, as it is in Russia. The majority of the men in Kevashinsk wear their strong black hair twisted behind into a queue with two tails; this is a custom peculiar to the Ostyaks, and quite unheard of among the Russian men. The inhabitants of these yurts had in general a handsome appearance, which was due to their tall, well-proportioned figures, as well as to their good fur-clothing. They were disfigured, nevertheless, in some degree by an endemic disease; for in our host's family, and among all who came to visit us, there was hardly one who had not bleared eyes and inflamed eyelids.

CHAP. XVIII.

SOSNOV. — FINE PINE-TREES. — ICE-WINDOWS. — FISH-SKIN CLOTHING. — MORTALITY AMONG THE OSTYAKS. — KONDINSK. — OFFICIAL INSOLENCE. — STONES IN THE OBI. — WHENCE THEY COME. — ISATSKIE. — ENDEMIC DISEASE. — ALESHKI. — UNFROZEN SPRINGS. — SHORKAL. — ENERGY OF RUSSIAN SETTLERS. — THE KASUIMSKY TRACED. — KUNDUVANSK. — INTERIOR OF THE YURT. — ERMINE TRAP. — TREATMENT OF THE DOGS. — ENCROACHMENTS OF THE RIVER. — OSTYAK OBSERVATIONS OF THE HEAVENS.

From Kevashinsk we went on fifteen versts to the Sosnóvian yurts. Situate on the left bank of the Obi, in a wide, basin-shaped hollow, these very justly take their name from Sósna, a pine, for they are surrounded by a superb pine forest. Round the village stand single firs, stone pines, and larches, from sixty to eighty feet high. At the tops only they have crowns of branches. Between these gigantic trunks there is but little underwood, and the undulating surface of snow is quite visible. But in the back-ground, on the hills round the broad hollow, the wood is much thicker, though not so lofty; the gigantic trees in the middle look like chosen leaders surrounded by the dense throng of their followers. The form and arrangement of the yurts add another feature to the remarkable character of the place. The dwellings are mere cubic boxes, made of stout logs laid one upon another. A layer of earth covers the flat roof, and earthen mounds are heaped up against the side walls. These huts are entered by creeping through an opening half the height of a man, on the south side. In the eastern wall, a little above the mound of earth, is a small square opening, left between the logs for a window.

A flake of ice, a foot thick, closes this window; it is propped from without by a pole, the lower end of which bears obliquely against the ground. A supply of such flakes lie before every yurt. As the fire is kept burning in the chubàl, opposite to the door, the ice-window is thawed on the inside, and as smooth as a mirror. Its outside is rough, yet a whiter and brighter light penetrated through this window than through the fish-skins in the dwellings already seen: as to distinguishing external objects, it is equally out of the question in both cases.

In the midst of these huts are other edifices of a still stranger appearance. Cubic, like the former, made of logs set one upon the other, and with flat earthen roofs, they differ from them in not standing on the ground, but are reared in the air to the height of eight or ten feet, on four strong posts at their corners; another post leans in a slanting position against the door of this building, and being cut in notches, it serves as a ladder for the men without allowing the dogs any access. In this circumstance lies the peculiar advantage of these elevated store-rooms, which serve only to keep the supply of food secure from the thievish propensities of the four-footed inmates of the place. In summer, also, the fish to be dried in the air is hung up on the posts that support these aërial magazines.

The inhabitants of the Sosnóvian yurts were hardly recognisable as being of kindred race with those of Kevashinsk, for they were all of small stature and delicate appearance. No one here wore furs, but the clothing was exclusively of fish-skins; hitherto we had frequently seen the people wearing boots of the nalùim skin, but here both men and women wore trousers, and two vests, the one drawn over the other, and fitting close to the body, of the same material. These skins are very strong and air-tight, and when

well rubbed with fat, it is possible that, as bad conductors of heat and cold, they may not be inferior to furs. In snowy weather, however, when the cold is less intense, they offer more security from wet than the latter. The disease of the eyes already mentioned prevailed here also, and added to the sickly looks of the people. Yet I saw one of the worst looking of these pigmies give proof of unexpected vigour, for he strung and drew the six-feet bow with the greatest facility and effect. He held the plane of the bow somewhat inclined towards the left, and, at the first offer, he struck with a blunt arrow the stem of a larch about 160 feet distant, near its top, about sixty feet from the ground.

Now, if, in the first place, we make abstraction of the resistance offered to the arrow by the air, it follows, from the data above stated, that if the arrow was aimed with an elevation of 30°, it must have had an initial velocity of 128 feet in a second in order to hit the mark. The whole length of the cast, supposing the arrow to pass the mark, would then be 456 feet. If we assume that the mark hit was the highest point of the arrow's path, then the initial velocity must have been 102 feet, and the elevation 36°.85. And if, in fine, the Ostyak shot off the arrow with an elevation of 45°, then the velocity must have been eighty-nine feet, while the amplitude of the shot would be 256 feet. But it is well known from experiment to what an extent, in the case of cannon and musket balls, the resistance of the air diminishes the effect, calculated abstractedly, and that, in order to hit the mark, it is often necessary to have five or sixfold the initial velocity indicated by calculation. The retardation of long and light arrows from this cause must be equal at least to that of lead and iron balls; and, consequently, we obtain from experiment but very disadvantageous notions of the strength

of the Kasuimskian bows. But, moreover, this strength was not all exerted in the case described, for the Sosnóvian archer drew his bow, intentionally as it seemed, not above half the length of the arrow. He seemed, also, to aim not much above the mark, that is, not to exceed an elevation of 30°; and possibly it was his intention to strike the mark in an ascending direction. It appears to me, therefore, that, under all the circumstances, the initial velocity in this instance must have been at least 600 feet, and I can hardly doubt that it might be increased to 1200 or 1500 feet by drawing the bow to the utmost.

In the midst of the Sosnóvian yurts was a hewn stem of a tree set upright like the mast of a ship. The cross-trees fixed to its upper extremity were carefully adorned with carved work. To our inquiries respecting its uses, the Ostyaks only said that it served to ornament the place. It is very probable that some superstition, akin to those which in Europe gave rise to the dressing of the Maypole, may have occasioned the erection of this singular ornament; at all events, the bits of paper which are kept at the lower part of the mast, sheltered under little roofs, have, for the Ostyaks, only a symbolical meaning. Some of them were fragments of orders and regulations, in Russian, given to the people of the place, but which they could never read.

The obligations to the state consist here in paying the yasak or tribute of half a sable for every man, and in keeping a few post-horses. That the latter task may be performed without much trouble, even in winter, is manifest from the fact, that it is done by aboriginal Siberian tribes, in other parts of the country where there is quite as much snow, to say nothing of the Tatar and Russian villages. In the immediate vicinity of the villages, the horses find some scanty support in the frozen herbage, but hay is

here a chief article of trade; and the Ostyaks charged with the keeping of horses choose to buy it from their Russian neighbours rather than make it themselves. Moreover, only the sledges of officers of high rank are here provided with horses; the Kosaks, in their frequent official journeys, can claim the use only of dog-sledges.

From these yurts to the next morning's stage, our route lay constantly on the ice of the Obi. About half-past three we reached the yurts of Karuimkarsk, which are situate near the end of the island already mentioned, in a spot tolerably free from wood, and about fifteen versts from Sosnòvinsk. Some of the Ostyak proprietors have here made, in the erection of their yurts, some approach to the Russian style of building, and have modified some other native usages also by imitation. In one of the houses a man from Tobolsk tried at first to hide from us; he was probably an exile who had made his escape from that place. But after I had removed his fears and inspired him with confidence, he told us that he was supported by the Ostyaks of this village, and that, in return, he soled and footed with leather their fish-skin boots. In proof of his statement, he showed us a chest containing his tools and some specimens of his work. His invention had met with universal approbation, and the Ostyaks of all the country round about began already to show a preference for the new kind of boots. We learned here, also, that the Ostyaks prepare the skin of the nalùim for clothing, by rubbing into it the roe of the same fish, for the fat which lies in layers in the roe, and which increases during the winter, makes the skin quite water-proof; and from this part of the fish alone can the fat be obtained by mere mechanical separation, without the trouble of melting it over a fire.

During the night we travelled from the yurts of

Karuimkarsk, forty-eight versts, it was said, to some distance beyond those of Bol-Atluimsk. The horses were changed at the latter place, as they had previously been at Leúshinsk and Malo-Atluimsk. In the last-named place, there arose a wordy strife among the Ostyaks during the business of yoking. The ordinarily high-pitched voice of these people rises with anger to a squeaking treble. However, their wrath did not carry them beyond words. The women took an active part in the contention; for, while fully as loud and eloquent as the men, they, at the same time, pulled the disputants back by the tails. The strong accentuation of the last word of every sentence, which we had remarked in the Bashkírs, was very perceptible here also among the Ostyaks; but when these were all speaking together, the noise they made resembled the cry of frogs.

In this part of our journey also I observed, for the first time, a very strongly-marked instinct of the horses of this country. The ice of the river is cracked across in several places, and though the cracks, generally speaking, are completely filled up by new ice, so that they might easily escape the notice of travellers not attentively observing them, yet they are always announced by the movements of the leading horse, which, even in full gallop, stops suddenly even before reaching the suspected place; then, after making some bounds aside, crosses it mistrustfully, trying with his fore-feet the firmness of the ice. These cracks, however, were evidently only the result of extreme cold, and the contraction of the upper stratum of ice.

But the next morning (Nov. 28.), soon after sunrise, we reached a more dangerous place, between Bol-Atluimsk and Kondinsk. There, on the right bank, there extends an opening perfectly free from ice (a polúinya), about a verst and a half long, and at

least fifty paces wide. The Ostyaks assured us that this place never freezes, and that springs underneath are known to be the cause of the phenomenon. In truth, the high banks of loose soil at this place seem well adapted for collecting spring water; and about fifteen miles further north I observed this day a spring that never freezes.

The Ostyak drivers on this part of the road deem it indispensably requisite to speak Russian to Russian horses; but the only fragments of that language which they have been able to pick up, or which have grown familiar to them, are the most vile and vulgar imprecations. These they employ to cheer and animate their cattle; and thus the foulest expressions were repeated, with a tender tone of voice, six times in the minute the whole night long.

An Ostyak of Atluimsk informed us of the great mortality that exists in his tribe. He himself had had thirteen children, of whom only four were living; and such is a common case. The Ostyaks marry early, and their marriages are fruitful; but the children, for the most part, die in youth. The inflammation of the eyes already mentioned, with some other maladies which will be hereafter brought to notice, seem, accordingly, to be symptoms of an endemic pestilence, which has been modified and subdued by general diffusion, and which has arisen from a complication of circumstances.

About 9 h. 50 m. we ascended the right bank of the river, through a narrow ravine, and arrived at the convent of Kondinsk, which, along with the houses of the Russian peasants depending on it, embraces an extent of about four square versts, close to the edge of the steep bank. The cleared plain is bounded to the east and north by a forest of stone-pine. The buildings of the convent are low, and in the simplest style, being distinguished only by the stone wall that

encloses them. Round the convent are scattered about twenty clean and well-built peasants' houses. We went to the last of these, at the north-west end of the place, and there we found in the interior much cheerfulness and comfort, though nothing like the opulence of Yelisárovo.

A little adventure in Kondinsk, which caused me some momentary annoyance, offered the first example within my experience of inhospitable conduct on the part of a Russian. The Sosièdátel, or assessor of the place, appears to have been led by the appearance of our sledge to look for a visit by an officer from Tobolsk; and with a zeal for the service, which was much increased by his happening to be drunk, he soon arrived, in his best uniform, to pay his respects to his superior as he supposed. The sight of our Ostyak clothing, however, and of the suspicious and incomprehensible magnetical instruments, with which I was at the time employed, put him quite out of temper. He inquired whence we came, and then gave us to understand that it was a gross mistake to suppose that German Pagans could be allowed to carry such wares into Siberia. He arrested, therefore, the whole company; but the Kosak from Tobolsk, as an accessary in the attempt, he would imprison separately. It was in vain that we showed our passports, as our dress and conduct were declared to be in direct contradiction to it. At length, however, by dint of firmness, we brought our tipsy hero to his senses. The hospitable farmers maintained a strict neutrality, and we threatened to proceed from words to deeds. The chop-fallen assailant now made his retreat, after he had given orders that we should be provided at once with horses. The magnetic obsèrvations were completed; and then, without the least desire to be further acquainted with the other inhabitants, we bade the place farewell.

We again travelled on the ice almost always quite close to the steep heights of the right bank. Here there was constantly to be seen, between the ice and the perpendicular cliffs, a gently rising strand, which is covered by the floods in spring and summer. On this were lying rolled stones, like those of Samárovo, but here of much greater size, for some of the stones were large enough to give cubes of six feet a side. It was evident that, this year, snow had fallen in this place only with a north-east wind, for the cliffs trending to the north-west had completely protected the adjoining strand from it, and the stones and sand there were quite uncovered.

The large stones just mentioned lay always together with smaller stones, in longish heaps, extending from the edge of the ice to the foot of the steep banks. Then came a hollow, quite free from stones, about ten or twenty paces wide, like a broad furrow, till again another heap of stones arose exactly like the former. From the constant repetition of these alternations, the surface of the strand here obtains, in a peculiar manner, the look of waves; and this arrangement of the blocks proves that they could not have fallen down from the banks upon the strand, for in that case it would have been impossible for them to become heaped up in so peculiar a manner, and, in accordance with the laws of gravitation, they must have settled in the furrows of the strand, and not, as here seen, on its highest points. Besides, I nowhere saw, though my attention was constantly directed to the matter, a stone projecting higher up from the face of the worn and naked precipice; and the Ostyaks, when questioned on the subject, agreed in declaring that, on the plain above the hills, there are no blocks of stone like those on the strand.

If we now turn to inquire whence came these remarkable fragments of rock, the supposition that they

are carried down by the ordinary floods, along the winding bed of the river, either from the Ural or the Altaï, is refuted at once by the gigantic size of the blocks. It would be impossible, in such a case, that the great stones, such as are seen here, should be carried 200 versts further than the incomparably smaller ones at Samárovo. If here, as in the case of the boulders in Northern Germany and Courland, we once admit the supposition of the transport of the stones in a straight line, from the nearest point of the mountain range lying immediately to the west, then the difference alluded to in the magnitude of the blocks may be at once explained from the consideration of geographical positions; for, according to my observations at Yelisárovo and at Shorkal, this point lies eighty-eight geographical miles further west, that is to say, much nearer than Samárovo to the Ural stretching northwards, or rather, hereabouts, north-eastwards. But that the blocks are found only in the bed of the river and on the strand is a remarkable fact. Like the hills at Kámuishlov, Tyumén, and Tobolsk, the steep side of the great plain towards the river consists only of a yellow talcose clay; but from Samárovo onward, the under surface of this soft stratum rests on another filled with large fragments of rock, and in which lies the bed of the Obi. In truth, it must be assumed that, west of the meridian of this place, the blocks contained in this deposit lie exposed on the surface of the low lands, while eastward of the river, they are completely covered by the great deposit of clay.

In the latitude of Tobolsk, not a single stone is to be found, either on the sides of the hills, or in the bed of the Irtuish, which is altogether contained in the deposit, there still deeper, of soft alluvium. It is a long way west of the meridian of the river that rolled stones are first met with in the hollows, in this

latitude. It is manifest, therefore, that in general for all the parallels of latitude in the government of Tobolsk, there is a plain extending eastwards and downwards from the ridge of the Uralian chain, which forms the *upper* limit of rolled stones. At Samárovo and Kondinsk, this plain coincides with the level of the Obi; whereas in the latitude of Tobolsk it reaches that level much further towards the west.

About forty minutes past twelve, and sixteen versts from Kondinsk, we reached a cluster of poor looking yurts, named Isátskie. Here, again, I saw the little log-houses for keeping the stock of provisions out of the reach of the dogs. They were raised on four poles to a good height from the ground, and could be got at only by climbing another pole or stem of a tree obliquely set against them. This place stands on a dry and bare spot, close to the edge of the high plain, on the right bank of the eastern branch of the Obi. The yurts are thickly peopled, but the only occupation of the inhabitants is fishing. They told us that they did not understand the Russian system of fishing with the hook in winter; but instead of it, they made use of the fish baskets (in Russian, Mórdi; see December 4. and 6.). Their clothing was made exclusively of skins of the nalùim sewn together, which were all dripping with fish-oil and grease, and gave the people an offensive smell, as well as a filthy appearance. But the attention bestowed on personal decoration, nevertheless, was manifest from the head-dress of most of the men, whose long, pitch-black hair was gathered into a queue, trimmed with broad ribbands, and with glass beads at the end. This fashion was followed by some whose hair, owing to a kind of leprous malady, had partially fallen off. A few, and among them a boy of fourteen, were quite bald, and the skin on their heads was covered with an eruption. Notwithstanding these symptoms of en-

demic disease, the men here were tall, and, collectively, above the middle size.

Very different in appearance were the site and the inhabitants of Aléshkinui Yurtuì (ten versts from Isátskiè), where we arrived after an hour's journey, on the smooth ice of the western arm of the river. Three huts stand at the entrance of a glen, which, from the right bank of this arm of the Obi, rises gradually up the side of the woody island. Near the dwellings are bushes and brush-wood, while the hills encircling the pretty dell are covered with tall pines. The men here were all healthy and well clad in reindeer skins. That they did not allow the advantages which the place offered for the chase to escape them, was proved by the skin of a great dark brown bear, which was hanging to dry on four upright poles, on the roof of one of the yurts. They had killed the animal a few days before in the adjacent wood, and, contrary to the usual practice, while it was awake.

The Ostyaks at this place gave us remarkably clear water to drink, and on our inquiring as to its source, they led us to a strong spring, the existence of which would never have been suspected in a tract covered with deep snow. We went about fifty paces up from the huts, along the bottom of the little glen, and there we saw a surface of ice about five feet wide, which had been broken through in some places to allow of drawing the running water. A thick grove of young alders (of the species called, in Russian, Olkha) marked the course of the rill higher up. We followed it about twenty paces further, where a second well had been formed. At this place, near the first source of the spring, the ice was much thinner than we found it lower down. I pierced it in many places below the well, and found the water running with a loud murmur in a narrow canal. The sides of this canal were formed of smooth ice, with as much regularity and

compactness as any masonry. But the under surface of the ice at the top exhibited throughout extraordinary projections, stretching perpendicularly downwards, like stalactites. The temperature of the air was at this time —6°.0 R., but that of the spring-water, both in the open well and in the various parts of the stream which I examined, I found to be +0°. 05 R. It is probable that the temperature of this water is a little higher, where it first issues from the earth, than at those accessible points of its course, where it gives off a part of its heat to the icy walls of its channel, which are perpetually cooled from without. Doubtless the formation of these copious springs has been favoured by the bed of drift and gravel below the sides of the hills, which, on the island, too, consist of fine mould, permeable to water. Below the yurts, towards the bank of the river, there was no further trace of the spring water; though it is possible that a portion of it might flow in that direction, beneath the deep covering of snow. The inhabitants of the yurts were unanimous in declaring that those springs and wells are never frozen, even in the hardest winter.

There was something extraordinary in the horror of my good-natured guide, when I accidentally trod in the water, with the skin boots having the fur outside. He laid it down as an indispensable precaution in such a case, to thrust the boots immediately into cold snow, so as to dry by congelation the water adhering to them before it reached the feet. A similar dread of wetting the covering of the feet frequently caught my attention, both before and after, among the Ostyaks, who are far from being tender or enervated. Whenever the men enter a yurt, they stop at the threshold, and with a piece of stick or with the knife hanging at their girdle, they pare off the snow from their boots. They are equally careful, in the case of boots sewn of rein-deer skin like mine, to remove the

flakes which are frozen on the sewings and between the hairs.

We proceeded at a smart trot for four leagues from Aléshkinui Yurtùi to Shórkalsky pogòst, a very respectable village, inhabited, like several of the settlements which we had previously seen on the Irtuish, at once by Russian and Ostyak families. The sky being perfectly clear, we succeeded here in making an excellent geographical observation, in the middle of the village and close to the small wooden church, for which Shórkal is famed in all the country around. From the Russian family of Novítsky we experienced the usual hospitable treatment, and their fireside chat proved rich in valuable information. The young master of the house informed us that his ancestors came from Little Russia, and that, in consequence of their services, he was numbered among the 'Soldiers' Children,' a class enjoying certain exemptions. Here in Siberia, the memory of such an origin is preserved a long time, because, however insignificant may be the advantages which it confers, they are nevertheless the marks of the only aristocracy known in the country. The successful exertions of the Promùishlenik were fully illustrated by the comfortable condition of this thriving family, the numerous members of which worked conjointly for the support of all, and carried on at once agriculture, fishing, hunting, and trade; keeping, at the same time, horses and dogs for the journeys of greater or less extent, which are here necessary in each of these pursuits. Every member of the family understood the Ostyak language besides the Russian; but the women of the house gave us to understand, that in this accomplishment their husbands much excelled them. This, in truth, was manifest enough when, towards evening, some Ostyak neighbours visited our Russian hosts. They were received with all the marks of courtesy which Russian peasants are

in the habit of showing to visitors of their own race and condition. The descendants of the conquerors and the conquered, live together in harmony and active friendship; and yet each of them, within his domestic circle, adheres steadfastly to the customs of his forefathers. Our host's house-furniture might be compared with that of a citizen of Tobolsk, for the rooms, which were kept very neat, were well provided with tables and chairs, and some presses, too, containing a samavar, a number of pewter plates, garments of cloth of different kinds, with a variety of other heir-looms of European origin. Things of this sort, as well as the holy image on the wall of the sitting-room, which was ornamented, of course, in a manner proportioned to the wealth of the family, are all still quite unknown in the yurts of the Ostyaks. In these, north of Sukhorákovsk, one no longer sees the boiler set in masonry, after the Vogul fashion, but an iron pot, of much less size, suspended in the chimney, constitutes the only cooking vessel. The richest of the yurts possess also a chest mounted with iron, the work of the Uralian-Russians; in which the furs intended for the payment of the yasak are guarded by the Ostyaks from one another's mercantile covetousness, rather than from the depredations of strangers. As to the rest of their furniture, it is usually formed of rude materials found not far off, and very little changed by industry.

After travelling for two hours in the open air, we found life and heat restored to us by a good repast. The excellent fish-soup was followed by boiled sturgeon, after which came roe of various kinds, as dessert. Nor must we forget to mention bread, salt, and kvas, which, as genuine European luxuries, constitute here the chief pride of the Russian housewife. The conversation of our host and his family was lively and interesting; and, though it is true that I could con-

trast it with nothing within my recent experience, except some instructive chat with Ostyaks, yet under any circumstances, one could not help being struck with the vigorous judgment and the hardy patience with which the frequent change from an active to a lonely and secluded life, endues the Russian Promuishlenik in an eminent degree. Novitsky, in speaking of his hunting and trading expeditions, made frequent mention of the Kasuimsky Ostyaks, whom I had heard spoken of in all the yurts since I left Kevashinsk, as a tribe living at a distance, and distinguished by its superior wealth and industry. Here, also, it was stated that the rich people in question pay an annual visit to this part of the river; but while the east had been hitherto invariably pointed out to us in answer to our inquiries respecting their dwelling-place, the Russians here maintained that the Kasuimsky, properly so called, live to the north of Shorkal; nay, it soon came to light that the rein-deer Ostyaks, who dwell along the river between Beresov and Obdorsk, are usually called by this comprehensive name. In this instance, therefore, we have a remarkable example of fluctuation in the use of ethnographical names, even in the countries where they originate; for it is well known, from the Siberian annals of the seventeenth century, that the Ostyaks, who were first known and celebrated under the name of Kas-Suimsky, dwelt about twenty-two degrees (640 miles) east of the Obi, between the parallels of Samárovo and Kevashinsk. The name then signified the dwellers on the Kas and Suim, two rivers which flow eastwards into the Yenisei, within those limits of latitude. Our friends at Kevashinsk, therefore, adhered most steadfastly to the original application of the expression, when they gave the name of Kasuimskian to the excellent bows brought to them by their neighbours on the east. The further north we pro-

ceed, the more uncertain we find the application of this term; and the Russians have even gone so far, as to give for the sake of a fixed meaning, the name of Kosuimsk, or, according to the pronunciation of Moscow, which prevails here, Kasuimsk, to a river and district close to Beresov. Thus the two central points which lay claim to this appellation, and are perpetually confounded together, lie nearly 700 miles asunder.

Between eleven o'clock at night and the following daybreak, we travelled northwards from Shorkal, on the ice of the second (reckoning from west to east) of the four arms of the Obi. On the westernmost of the three islands formed by these arms, lie some scattered yurts, besides the Ostyak settlement of Chemákhevsk, all which are collectively some versts distant from the left bank of that second arm. We reached the village through dry hollows and glens quite free from ice, but which are doubtless filled with water in the spring.

November 29. — The Ostyaks of Chemákhevsk busied themselves about our two sledges, with the usual shrillness of voice and vivacity of speech. There seemed to be at least twenty inhabitants of the yurts zealously employed about the harnessing, to which they are but little accustomed, yet more than an hour elapsed before we were ready to start, with a change of five horses and three men.

The appearance of our train, as day broke, was quite startling: for we had hitherto seen no Ostyaks so strange-looking and different from one another as our present drivers. One of them had only a thin Russian handkerchief tied round his head, his long plaited tails being left unconfined, and as he wore also the white summer frock, he looked exactly like a woman. Another, who was clothed in rein-deer skin, threw back his hood, and allowed his long black

hair to toss in the wind, so that, as he galloped along, he looked like one of the Furies. They were all afflicted with sore eyes, but their heads showed no signs of eruptive disease.

In the morning, about forty minutes past ten, we arrived at the yurts of Kunduvansk, where we stayed two hours, and made our last magnetic observation on the road to Beresov. New and unexpected contrivances continued to present themselves in the economy of the yurts; for even among this frugal people, the art of living is most easily learned from practice. Of the interior of the yurt, which was about thirty feet square, a portion, only six feet wide, along the walls, was set apart for the separate lodges and sleeping places. It was divided in the middle by low boards, but towards the sides by higher partitions, into five compartments. Just like the berths round the cabin of an European ship, so there were here, round the hearth, separate nooks for each member of the family. Each individual spreads his rein-deer skin clothes, along with additional uncut skins, in his berth, to make himself a soft and comfortable bed.

The most remarkable object here was an old woman who sat in the corner of her bed-place, with her head completely veiled over, working industriously at some skin clothing, which she sewed with thread made of the fibre of rein-deer sinew. She declared that day and night were alike to her, and that she guided the needle only by the sense of feeling, her tongue helping her to thread it. We saw enough to satisfy us as to the correctness of her statement. However, she was no great loser by the singular custom of veiling, for inflammation of the eyes had nearly blinded her; there was no fire at this time in the Chubal, and hardly a ray of light penetrated from the ice-window into the corner where she sat.

Notwithstanding the prudent adaptation to local

circumstances visible in the construction of the Ostyak chimneys, it still happens occasionally, that during the storms of winter they refuse to perform their office; and it is then doubly necessary, when the fire is out, to be able to close the flue perfectly against the wind and snow, so as to be able to lie down in comfort under the furs, and to preserve the warmth previously accumulated in the house. It was here that I first observed the contrivance resorted to for this purpose, but which is nevertheless in general use, and seems well adapted to attain the proposed object. The Ostyaks dig up a young tree, taking care to preserve the ball of earth which, in loamy soils, adheres to the roots. They cut the stem to a length of about eight feet, and give the earthy ball a cylindrical form, so as to make it fit the flue exactly, when thrust up the chimney.

The Ostyaks of Kunduvansk showed us, as an important piece of apparatus, a trap used to take ermines, and the ordinary names of which indicate its principle; for the Russians call it "the self-shooting bow," the Ostyaks simply "the bow." It consists of a spade-shaped board, in the lower and broader end of which is a round hole to receive the animal's neck. Below this is fixed the bow, the string of which is connected with the top or upper end of another board, shaped like the former, and moving close to it. Thus the bow acts as a spring which drives down the second board, so as to cover the hole cut in the first. In setting the trap, the bow-string, with the attached sliding board, is checked above by means of a kind of button or crooked lever, which is again held by a string fastened below to a piece of stick placed diametrically across the hole cut in the trap. The tension of that string, it is evident, alone restrains the bow. When the ermine, therefore, endeavouring to make its way through the hole in the trap, displaces

the transverse stick to which the string is fastened, the bow-string is immediately released; the sliding-board shoots down, and the animal is caught. When the adjustments are carefully made, the slightest touch on the cross-stick suffices to free the bow. The trap is set opposite to old rat-holes or hollows among the roots of trees, where the ermines choose their quarters, or it is placed leaning against a heap of snow, on which lies the bait.

In the dogs at Kunduvansk again we remarked the perfect uniformity of their appearance. Here, as in the yurts previously visited, they were spotted black and white; these colours being, generally speaking, in very different proportions in different places, but combined with little variety in the individuals belonging to the same place. Here the full grown dogs had all a black spot on the neck. In size and shape they resembled those already seen; but our host informed us that the breed of this place was famed throughout the neighbourhood for superior strength and docility; each of their dogs being equally good for draught and for the chase. The cry, "púir, púir," has a twofold application, for it incites the dogs to drag the sledge as well as to beat about in hunting. In travelling through the woods in search of game, the hunter in his sledge entrusts himself almost wholly to the sagacity of his dogs, which, with a little cheering to urge them on, lead him safely through the trackless wilds.

Notwithstanding their fidelity and important services, the dogs often experience very unkind treatment from their masters. I observed that the Ostyaks flew into a passion as often as one of their dogs contrived to slip into the yurt on the opening of the door; the poor animal was immediately expelled, as if it were a wild beast, with blows and kicks from all the bystanders. On these occasions the cries of the

women, too, might be heard; and from the peculiarly high-pitched, and thin tone of their voices, they strongly reminded me of the cries of a delicate European woman expressing violent repugnance in an affected or exaggerated manner. But this comparison is, in one respect, unjust, for the anger of the Ostyak women is, in these cases, very sincere and well-founded. They naturally fear that the voracity and thievish cunning of the dogs, if these be allowed to enter the house, will reduce its inmates to short commons.

A wooden trough, set on the floor in the corner of the yurt, serves as the common eating vessel, and is replenished every morning with the day's provisions for the whole family. In general, victuals are cooked but once a day, and sometimes the whole produce of a successful fishing is dressed at once, so that the assurance of abundance for some time to come, lies wholly in the food-trough. It is only when the dogs return wearied and distressed from a long journey, that they are allowed to enter the yurt and to lie down near the fire, till a frugal meal of fish is served to them in the common trough.

Yet an exception is made in favour of the young dogs, which, at Kunduvansk and other places, I saw taken into the warm houses and treated very tenderly by the women. They were tied to the step at the foot of the bed place, and were well fed. Like the old dogs, they were only black and white; but not with so regular a distribution of the colours as in the former, from which they differed also in having much longer hair. These young dogs are not all reared for draught; some were pointed out to us, the fine, long, fleecy hair of which was destined ere long to trim pelisses.

Leaving Kunduvansk, we travelled for three hours on the ice, and a little after sunset reached the yurts

of Protók, a name which calls to mind the remarkable division of the river. In this place, the two more western arms of the stream, which are called respectively *maloí* and *bolshoí* Obi, the little and the great Obi, are alone spoken of. Of the first and most western of these in particular, the Ostyaks remarked that it constantly encroaches on its right bank, so that its bed is moving eastwards. One of them told me that within his recollection (perhaps thirty years) the river had shifted in that direction about three versts. It would seem, therefore, that owing to the general inclination of the country, the divided arms of the Obi have here a tendency to reunite.

From the yurts of Protók to Beresov, is reckoned a distance of seventy-five versts, yet during our night's journey between those places we did not meet with a single habitation, and our expectation being constantly on the stretch respecting this first object of the expedition, the way seemed unusually long. This was not the fault of the horses, for they were active and in good condition. Our drivers again informed us that they bought their hay from the Russians at Beresov. Here I inquired, as I had often done before, why they did not keep rein-deer, and received for answer, that they had no moss, which is found only in the mountains (po goràm), beyond Beresov. Yet we were told respecting the Kasuimsky (see page 449.), or the people who inhabit the banks of the Kasuimsk, not far from Beresov, towards the east, that they are rich in herds of rein-deer. Now, as there are in reality no mountains in the place referred to, but the pastures are on hills resembling those of the locality through which we were travelling, there seems little reason to doubt that rein-deer might be kept on the banks of the Obi, south of Beresov. But this is a kind of husbandry incompatible with the business of the fisherman, and con-

sequently the keeping of deer has given way to that of dogs.

When about half-way, I asked our Ostyak attendant whether he could tell how late it was, and he answered very correctly, that it was not yet quite midnight. This, he assured me, he could discern by the position of the Great Bear, which he named *Los* or the elk.

This observation is founded on the circumstance that about the autumnal equinox, at sunset, the head of the supposed animal in the constellation, is directly below its tail on the same meridian; but at midnight they are both at the same height, the figure in the constellation being on its back; while again the head of the figure at sunrise, is at the greatest elevation above the tail. We, Europeans, would think a clock of this kind extremely inconvenient, inasmuch as the true import of its direct indications, changes and revolves with the seasons; and if we fancy ourselves in the place of the Ostyaks, we must acknowledge that they show no little cleverness in recollecting accurately, as in the present instance for example, that the position of the heavens which was observed at midnight, at the autumnal equinox, takes place now between seven and eight o'clock in the evening, while the phenomenon which, at that season, marked the hour of sunrise, is now observable at half-past one in the morning. In this case, use has made man expert in forming judgments, the grounds of which are by no means obvious; for the Ostyaks cannot tell the hour without first reckoning how many months have elapsed since the autumnal equinox, and then adding a twelfth of a day for each month so elapsed to the result obtained in the first instance byinspection of the heavens.

The icy plain presented by the westernmost branch of the river grew continually wider; the air was ex-

tremely humid, and at a temperature of −6° R. The unusually monotonous night's journey proved so wearisome, that it became impossible to resist any longer the inclination to sleep, just as we were approaching, without being aware of it, the long expected goal.

CHAP. XIX.

BERESOV. — PINE WOODS. — DARKNESS. — HOSPITALITY. — THE EXILED MENCHIKOF. — HIS GRAVE OPENED IN 1821. — PERPETUAL CONGELATION OF THE GROUND. — COINS PRESERVED BY THE OSTYAKS. — THE AURORA BOREALIS. — TEMPERATURE OF THE GROUND DETERMINED. — SIBERIAN MAGNETIC POLE. — THE MERCANTILE CLASS. — CULTURE OF GRAIN AT BERESOV. — PELTRY. — THE BEAVER. — THE TRADER'S DOMESTIC LIFE. — TATAR TRADERS. — HONESTY OF THE OSTYAKS. — THEIR MODE OF SWEARING. — EXILES. — MORAL IMPROVEMENT OF BANISHED AND EMANCIPATED SERFS.

November 30.—I AWOKE about one o'clock in the morning, as our sledge stopped before the steps of a Russian house in Beresov. Here, instead of calling for fresh horses, as we had been so long accustomed to do, we made arrangements for a residence of some duration. The sledges were unloaded, and then, after the Russian fashion, every one hastened to make himself amends for his previous sufferings from the cold, by a night's rest in an apartment heated to excess.

We made the acquaintance of some of the inhabitants of Beresov, before we had an opportunity of observing the situation or local character of the place; for the Gorodnichi, or head man of the town, and, after him, five or six other Chinovniki, or officers entitled to wear uniform, came to welcome us before it was yet day. There was nothing here to remind us of what took place at Kondinsk (see p. 441.). The officers only inquired, as is usual with the Russians, whether we had got through our journey without accident, and not, for what purpose we had made it. Yet the arrival of a stranger from Tobolsk at this season of the year, is a very rare occurrence. Sometimes, merchants travel northwards through Beresov, but

later in the winter, so as to meet the Samoyedes who resort to Obdorsk for the purposes of trade, in February.

At some distance westwards from the most western arm of the Obi, stands the town, in an elevated situation on the left bank of the Sosva, which, running towards the N.N.E., joins that great river about twenty versts lower down. Another smaller stream coming from the S.W.—the Vogulka—enters the Sosva, on the left, about three versts from the town. These two streams have for some distance nearly parallel courses, enclosing between them a hilly tract, on which lies nearly the whole of Beresov. A few houses, however, are at the further side of the Vogulka, which is crossed by wooden footways, connecting in several places the low banks of the rivulet.

On our first walk through the town, the general appearance of the place made the impression which might be expected from the last habitation of man. From my determination of the geographical position of the town, I conclude that at this date the sun rises at $9^h.\ 39^m.$ true time, and attains at noon an elevation of $4°\ 18'$, but the sky being uniformly clouded, there is little difference between day and twilight. The light prevailing here is that of "the half-dark day," which, as a Russian poet justly remarks, has a magical charm for the heart of every inhabitant of the north, and respecting which he declares that a Samoyede in Naples would keenly feel its loss. The wooden houses are carefully built of large timbers, generally with high steps before them, the bath-houses and other offices being usually connected with the dwellings by wooden palings. Within these are open courts; but the buildings collectively are made to range with the streets, which partly run northwards to the plain which slopes to the Vogulka, and partly eastwards to the bank of the Sosva, which is

about eighty feet high. Even now, this river is fully entitled to its name (Sosva and Sosna, a pine tree), for the snow-clad declivities of its banks are still covered with a noble wood from forty to sixty feet in height. But beyond the river may be seen an uninterrupted plain of snow and ice extending to the horizon, and in this direction the waters of the Sosva and Western Obi, during the spring, overflow the country to a distance of fifty versts. The silence of the desert reigned in the dark streets; the columns of smoke from the chimneys alone gave signs of living inhabitants. The Ostyaks, who come from the south in their low dog sledges, always turn off westwards from the middle of the town to the houses of the Kosaks.

It would be a great mistake, however, to judge of the interior of the snow-covered houses from the dreary and inanimate appearance of the streets, for, instead of finding the people sunk in their winter sleep, one sees them full of hilarity and vigour, and willing to enjoy life. In conformity with the ancient Russian usage, the duty of entertaining the strangers was not allowed to fall on a single family, but during a residence of five days in the place, I was continually moving as a guest from house to house. In the course of each day, the wandering social circle, as I may call it, kept continually increasing, my hosts of the preceding days always joining it, until at last the *posejenki*, or evening sittings of the men, consumed not a little of the long winter's night. One might spend years in this conversational life without wishing for anything better; for the weighty experience of many generations is here accumulated into a rich treasure, and the men who have collected and who impart it, seem gifted in no ordinary degree. Nowhere else did I find among the natives so lively an interest in the objects of our journey, and it is entirely owing to

the circumstance, that many here had been instinctively led to meditate on philosophical questions, that besides the geographical and magnetical observations, I obtained at Beresov much valuable information respecting the peculiarities of the climate, as well as the men and animals inhabiting the country around.

Many fortunate circumstances combine to give the people of Beresov these happy dispositions. The downright necessity of maintaining without intermission a struggle with the rigours of the climate, has developed here, as in every sequestered spot in Siberia, the true genius of *promuísl* (see p. 332.), and with it, the faculty of theoretical speculation among all classes of society. Then, Russian crews, who make their way from the Icy Sea to Beresov in search of winter quarters,—though visits of this influential and memorable character are of rare occurrence,—leave behind them a store of novel information; but, besides, for two centuries back the blood of the people in this place has been continually mixed with that of the most able and accomplished men of the mother country, for the flower of the Russian court and army lie buried here beneath the snow of Beresov, and the native priests, merchants, and Kosaks of the settlement, inherit their intellectual vigour from their fathers, who were European generals or statesmen, while to their mothers they owe their familiarity with the Ostyak language.

On Sunday, after divine service, I paid a visit to the protopope or chief priest, M. J. Bergúnof, who occupies, as the reward of twenty years' industry, a very comfortable villa on the plain sloping to the Vogulka. Respecting the temperature of the ground, I soon found it to be the general belief of the natives, that the earth thaws here only on the surface during the summer months, while perpetual congelation subsists beneath. This view of the case has recently

become associated in a singular way with the events of the last century. The oral chronicles of the inhabitants of Beresov can still furnish many details respecting the character and habits of the favourites of Peter I., for Osterman, Dolgorúkof, and Menchikof, who all ended their remarkable lives here in an exile equally remarkable, are frequently the themes of conversation. Yet it was quite unexpectedly that the body of one of those men, whose spiritual images are still preserved here with vivid freshness, was brought to light again in Beresov after a lapse of ninety-two years. It was known that Menchikof, after his political extinction, prepared himself for his natural decease by devout penitence. He worked with his own hands in erecting the little wooden church, now fallen to decay, which stands thirty or forty feet above the bank of the Sosva, at the southern extremity of the town; he then served in it as bell-ringer, and was finally buried by the grateful inhabitants of Beresov, immediately before the door of the building. His resting-place, not marked by any monument, but known only through tradition, remained undisturbed till 1821, when some information respecting it reached the ears of the governor of Tobolsk, and was communicated by him to Menchikof's biographer: the grave was then opened; the coffin was found to be imbedded in frozen soil, and its contents had undergone so little change, that pieces of the clothing which wrapped the body, were sent to the descendants of the deceased, and even the eyebrows, heart, and other parts of the corpse were added to these relics.

It is not to be wondered at that here, where repeated and daily experience proves that all organic bodies are protected from dissolution by the frost, this extraordinary event should have served to confirm the belief that the ground is perpetually frozen a little below the surface. But whether other dead

bodies, buried later than Menchikof, and in other places, have been protected in like manner by the frost, is a question not yet set at rest by experience; and, indeed, there is some reason for doubting the fact, as the graves are seldom dug to the depth of constant temperature. On the other side, I was assured by M. Bergúnof, that north of Aléshki (see p. 445.), and nearer to Beresov, were springs which, like those at the former of these places, remain unfrozen throughout the winter, so that it still remains doubtful whether this phenomenon, or the perpetual congelation generally believed in, is to be regarded as only a local exception from the general condition of the region. To determine this point, therefore, I resolved to sink a thermometer, by means of my boring apparatus, some twenty or thirty feet into the ground. At the same time, I learned to my satisfaction, that it had been long reckoned among the duties of the head master of the school, to note three times a day the temperature of the atmosphere and the direction of the wind. I compared the thermometer which was used for these observations carefully with my own, and then made a copy of the important meteorological journal.

December 1.—Aided by a Kosak, I began to-day my experiment of boring, and chose for this purpose a spot at the north end of the town, 59·8 feet above the level of the Vogulka, in front of the greater of the two churches of Beresov, and not far from the burial place already mentioned. Towards the north, this spot was encompassed by a wood of tall pine trees, and the remains of trees which had been grubbed up, lay scattered around. Whether it was that the ground here was protected in some measure from the frost by these circumstances, or that the occasional loosening of the soil in the woods, may have chanced to facilitate our labour, the workmen maintained unani-

mously that this was the only place where it was possible to penetrate the upper strata without the greatest difficulty, and that it could not be done on the bare and comparatively low plain at the south side of the town; but if there is any value to be attached to this mode of determining the temperature of the ground, the influence of superficial local circumstances must vanish at a certain depth, and, consequently, there was no reason for increasing designedly the difficulties of the attempt.

There was pointed out to us, as an important monument of an early epoch in the history of Beresov, a larch about fifty feet high, and now, through age, flourishing only at the summit, which has been preserved in the churchyard. In former times, when the Ostyak rulers dwelt in Beresov, this tree was a particular object of their adoration. In this, as in many other instances observed by the Russians, the peculiar sacredness of the tree was due to the singularity of its form and growth, for about six feet from the ground, the trunk separated into two equal parts, and again united. It was the custom of the superstitious natives to place costly offerings of every kind in the opening of the trunk; nor have they yet abandoned the usage; a fact well known to the enlightened Kosaks, who enrich themselves by carrying off secretly the sacrificial gifts. Among other things found here, are silver coins, belonging to an age when it cannot be supposed that the Ostyaks obtained them from the Russians on the Irtuish and Obi, who have but little specie even at the present day; and it is maintained in Beresov, that these and other articles of value, which were used here in various ways for superstitious purposes, have been preserved in the remote yurts as heir-looms, from those early times, antecedent to the conquest of the country by the Russians, when the Bokharian merchants, and others

from southern Asia, penetrated direct to the polar circle, and collected from the Voguls and Samoyedes — perhaps, occasionally also from the Ostyaks, the furs which they can obtain at present only through the hands of the Russians.

Along with this singular information respecting the treasures which are sometimes found among the Ostyaks, we met to-day with a work of art, the fate of which is curious and not to be easily explained. From the sacred larch we went over to the adjoining Russian church, which was built, as we were informed, and adorned, about the year 1770, at the expense of a Kosak subaltern. Together with the other ornaments usual in Greek churches, we were here shown an altar-piece, representing St. Veronica in the act of unfolding the handkerchief on which is impressed the portrait of the Redeemer. This is a legend of frequent occurrence in Greek churches; but the painting in question was very obviously and advantageously distinguished from the ordinary style of the Russian obrasa; for, instead of the swarthy complexion and the Mongolian features which characterise that class of productions, one could here recognise something like the beauty of the Italian school; and, besides, I could discern, on close examination, near the margin of the picture, a Latin inscription, which is usually a thing unheard of in Russian churches. It ran as follows: —

"Vera salutoris imago ad Regem Abrogum missa,"

in which it is not easy to discover what the character A stands for. It may be either a Greek lamda or the letter A unfinished; but the appearance of the other letters would not allow us to suppose that there had been any obliteration. No one in Beresov could tell any thing of the origin of this picture,

presented it to the church; nor did any one, Russian or Ostyak, remember to have ever heard of a king named Lbrog or Abrog; but, in truth, it can hardly be doubted that the unknown artist had in view no other than Abgar, King of Odessa in Syria, respecting whom we are informed, by the legend of the Romish church, that Christ himself sent him his portrait in order to release the king from a heavy sickness.

At the place where we had commenced boring for the purpose of determining the mean temperature of the earth, the mineralogical constitution of the soil was just like what we had already observed at Tobolsk, for we saw nothing here but a yellow clay, free from quartz, and probably of a talcose nature. The work advanced very slowly, and at first, towards the surface, we were obliged to break the ground with axes; but when the hole had been sunk to the depth of five feet, we found, what all our collected information had not led us to expect—a stratum of soft earth, which evidently was not frozen: in this we continued to bore till evening, when, finding that we had not as yet gone far enough, we deferred the completion of the experiment and the sinking of the thermometer till the following day.

We went to-day to the mouth of the Vogulka, about two versts north-east from the part of the town where we had been working, in order to see two magazines, in which flour and salt are kept for the supply of the inhabitants of Beresov and their Ostyak neighbours. There are similar establishments at Samárovo as we have already remarked, as well as at Kondinsk, and on the Obi below Beresov, at the yurts of Kushevatsk, and at Obdorsk. The provisions contained in these stores are bought up in the circle of Tobolsk, and serve partly, under the name of imperial rations, for the support of the Russians employed in the public service; and partly as village provisions, to be retailed

by the local authorities to the remaining Russian and Ostyak population.

The reindeer and sledge which we made use of on this excursion, belonged to an Ostyak who happened just then to be in the town. No one in Beresov keeps these animals, and, even when they are occasionally brought here from the north they can be kept in the town only for a few hours, as they cannot be trained with any care to feed from the hand or from a stall; they will only crop the fresh and living vegetation. When they arrive in Beresov, therefore, they are not unharnessed or loosed from the sledge, but the timid animals are kept in the enclosed yards or in the streets, awaiting the departure of their masters. As all the peculiarities of reindeer travelling are to be hereafter described together, I shall here only mention, that in this, our first trial, the sledge was drawn by two males and one female deer which ran abreast. The males were equal in height to the tallest red deer of Europe; the female was somewhat less. They were all three white, with only a few ash-grey spots on the back. Until one grows used to this new form of the deer, the long and bushy hair, like a mane, under the throat, has a strange appearance. They all had high antlers, and we were told that they would not throw them off before the middle of February. The renewal of the antlers would seem, therefore, to depend but little on the influence of temperature and climate, for it takes place in the same month here as in Germany, notwithstanding the interval of eight and thirty days which separates the first appearance of foliage in central Germany, from the corresponding phenomenon in the neighbourhood of Beresov. In the wood near the mouth of the Vogulka I observed some spots sheltered accidentally from the snow, in which again it was impossible to overlook the very perfect manner in

which the vegetation was preserved. The soil, which is in summer well moistened, was covered with an even carpet of empetrum and ledum palustre, and I could now more clearly understand the accounts which I had read of the extraordinary rapidity with which, in the spring, a rich verdure succeeds the melting of the snow.

In order to determine the magnetic declination, I observed, about eight o'clock in the evening, the passage of the pole-star through the transit instrument. A few minutes after the observation was concluded, the clouds, which had hitherto obscured the lower part of the northern sky, disappeared, and we saw in their stead a brilliant auroral light. Towards the horizon there was still some darkness, but above that there was bright light, which rose highest at a point about 27° west of the astronomical, 38° west of the magnetical north; the greatest elevation being about 6° above the horizon; and from that point an irregular arch of light extended downwards on both sides towards the horizon. Extremely vivid bands of light, from half to three quarters of a degree in breadth, shot up frequently from different points of the arch. I could not perceive, however, that these radiations converged towards the zenith: on the contrary, those from the eastern side of the arch seemed decidedly to tend towards points east of the zenith; those from the western side, in like manner, to lean westwards, just as if they had all diverged from a point below the horizon and within the arch. These phenomena continued, without any change of character the whole night, till near sunrise, when the sky became clouded. In every part of the fixed arch, the light was in unceasingly tremulous motion; its brightness increased from time to time, and at those moments the radiated pillars of light also rose higher and brighter than usual. The colour of the light was

yellow-red, and underwent but little change. About twenty-five minutes past ten, the apparent width of the region of the heavens filled with light was measured, and was ascertained to lie within the vertical circles of N. 15° E., and N. 30° W.

The effect of this phenomenon on each of the three magnetical elements, declination, inclination or dip, and intensity, was determined by observations which I made during the night, and compared with others made in the same place at other times. During the activity of the aurora, the north-end of the needle stood fifteen minutes west of the ordinary magnetic meridian of the place; so that the plane of the new resultant of forces, lay nearer to the middle of the illuminated region than the plane of the ordinary magnetic meridian. In this respect, therefore, the effect of this phenomenon, though in an opposite direction, was strictly analogous to what we had already observed in Tobolsk; for, as a polar light, situate east of the magnetic meridian, had there drawn the needle to the east, so here the light on the opposite side had caused a disturbance in the opposite direction.

At the same time, the activity of the northern light increased the inclination of the magnet to the horizon about eight minutes; but the intensity of the new resultant of forces was hardly greater than that of the normal state. If, for example, we conceive the cause of these disturbances to have been an attraction acting on the north end of the needle, it would be found that the intensity of this attraction was the $\frac{46}{10000}$ of the conventional unit of terrestrial magnetism; and, that the attracting point was situate in a line which, running in the direction of S. 37° W. (astronomical azimuth), lay about 64° below the horizon. The point in the heavens which might have produced the same phenomena, by repelling the

north end, or attracting the south end of the needle, would accordingly lie about 44°.5 east from the middle of the luminous space, and about 64° above the horizon; so that the cause of the disturbance does not by any means stand in so simple a relation to the visible phenomena, as has been imagined by those who maintain that the auroral light indicates the centre of the magnetic force.

The fact that, in the present instance, neither the middle of the coruscating area, nor the point of the heavens from which proceeded the attraction for the south end of the needle, lay in the vertical plane of the magnetic meridian; but that while the polar light inclined to the west of that plane, the attracting point was distant about 25°·3 from it towards the east, acquires importance from the unanimous and distinct assurance of the people of Beresov, that they are accustomed here to distinguish between two kinds of polar light. The one, like that seen to-day, which appears on the western side of the sky, is always fainter and lower than that which shows itself east of the meridian. The latter, which is sometimes observable for months together throughout the night, begins regularly about the time of the greatest cold, and is often so elevated and so bright as to frighten the animals in the sledges. I cannot refrain from offering, in explanation of these phenomena, the conjecture, that these twofold northern lights have for centres, the one the magnetic pole which lies north-west from this, and the other a pole situate towards the north-east, and much nearer; and that the emanation of light from one of these poles is accompanied with an attraction of the south end, or repulsion of the north end, of the needle by the other.*

* If we suppose the vertical plane, from which proceeded the deviating force to day, produced northwards, its nearest point to the geographical north-pole will be in lat. 74°·5 N., and in long. 125°·25 E., or under

December 2. — The people of Beresov all maintained that the polar light of yesterday announced the return of the regular cold, and this prediction was confirmed to-day in a remarkable manner. They had experienced here, from the 12th to the 22nd of November, agreeably to the ordinary conditions of the climate, a mean temperature by day of —15°·5 R., varying only from —13° R. to —24° R.; but that was succeeded by a remarkable increase of warmth, with an uninterrupted south-west wind, which lasted till yesterday, having prevailed from Tobolsk to Beresov, and which raised the temperature to —6° R., or even +1°, and in the mean of the ten anomalous days, to —2°·2 R. But to-day a north-west wind set in, and by noon it had lowered the temperature to —10°, towards evening to —15°, and by the following day to —23° R. The coincidence of this change with the first polar light of the season is worthy of remark; whether we suppose that the north-west wind cleared away the vapour or haziness which had intervened between Beresov and the scene of those phenomena, or that, in fact, such changes in the direction of the wind are favourable to their production. A similar struggle between the north and south wind takes place here repeatedly in the course of every winter, but it is only at the commencement of the cold season that it is attended with so remarkable a change of temperature.

The affair of the temperature of the ground came

the same meridian in which our subsequent observations ascertained the existence of the second and Siberian magnetic pole. The fact, that the latitude of the point indicated by the auroral light is something less than that of the pole as determined by other means, proves nothing against their identity; for, under the circumstances of the case, very slight errors of observation would produce considerable effect on the apparent result. The other or North American magnetic pole lies, according to Parry's observations, in the azimuth N. 4°·8 W. from Beresov, or near the middle of the space illumined by to-day's aurora.

to-day to a conclusion. About noon we had reached a depth of 23·3 feet. The yellow earth taken up was mixed with water in the fluid state. The thermometer, in the air, indicated —8° R. as I screwed it to the auger used for the boring; but after remaining three hours at the bottom of the hole, it rose to +1°·60 R.: that is to say, it rose to nearly the same temperature which it had indicated in the ground at Tobolsk, situate 360 miles to the S.S.E. Of course we have no alternative but to admit that throughout this region the isothermal lines, marking equal mean temperatures, run in a direction from S.S.E. to N.N.W.* Like the isodynamic lines (marking equal magnetic forces), as they were determined by my observations between Tobolsk and Beresov, the isothermal lines exhibit an extraordinary deviation from the parallels of latitude, and both kinds of curves seem here to have one and the same form. In both cases it was necessary to look for the centres of the figures, or the points round which the curves are symmetrically arranged; and, without any inference from the consideration of causes, it was quite manifest that we must admit the existence of a pole of cold, quite distinct from the geographical pole, as well as a magnetic pole, and nearly in the same place as the latter. These points must be regarded as centres of phenomena, or places round which like results are observable at like distances, without supposing that there is any peculiar force or virtue stationed at either the one point or the other. Consequently, lines drawn perpendicularly from the isothermal and isodynamic lines at Beresov, show

* Notwithstanding this slight difference in mean temperature between Beresov and Tobolsk, there is a considerable difference in respect to the mode in which the heat is distributed through the several seasons; it is also necessary to mention, in order that the form of the isothermal lines may be properly understood, that I found Beresov to be 2°·26 further west than it is placed in the Russian maps, and 3°·23 west of the meridian of Tobolsk.

that the greatest increase of cold, as well as of the magnetic force in equal distances, take place in advancing E. N. E.; and, therefore, that all the circles lying in this direction enclose the Siberian centre of cold, as well as the Siberian magnetic pole.

This day was an Imperial holyday (Tsárski den)—a distinction perceptible even here, for when the mass was over the usual social gathering increased to a large company; but now, as on preceding days, the *posejenki* or evening sittings, in the house of the merchant Nijegoródsov, yielded the hours of greatest enjoyment. Although there is hardly a Russian in this northern country who does not obtain his livelihood by constantly bartering with the aboriginal tribes who pay the yasak or tribute, yet the general laws of the land, with respect to traders, are in force even here; and the rights and privileges of the mercantile class, or *kupécheski gildi*, are enjoyed only by those whose annual income, derived from business, rises to a certain amount. Of these merchants, properly so called, there are nine in the circle of Beresov, who are all connected by consanguinity or marriage with the family of Nijegoródsov, and thus form a united and recognised aristocracy, extending from Samárovo to the Icy Sea. The oldest and the wealthiest member of this family was at this time settled in Beresov, and, after travelling as a trader for sixty years, he now contented himself with guiding the operations of his emissaries and agents. The results which I had arrived at respecting the mean temperature of Beresov, and which justified the supposition that the climate of this place is, for annual plants, hardly less favourable than of Tobolsk, met with a zealous supporter in Nijegoródsov. He was the first to make the experiment, a few years ago, at Beresov, and his efforts were rewarded with success. He showed us specimens of rye and barley reared from seed grown

in the place, and also, for comparison, the produce of foreign seed. The grain was prudently obtained, in the first instance, by means of mercantile correspondents in Archangel, partly from Abo in Finland, partly from Tornea. The barley has thriven well, and last year yielded twenty-fold; the rye, however, fell off in its produce in the same season; a fact ascribed to an unfavourable north wind, which, on the night of the eleventh of September, and just before the harvest-time, covered the fields with snow.*

For the Russian population of this place, the complete success of this experiment, and continued favourable results, would be of the greatest importance, not so much on account of their own wants as because grain and flour chiefly take the place of money in the trade with the Ostyaks and Samoyedes. The supplies required for this purpose are drawn from the government of Tomsk, and the southern part of that of Tobolsk; and it is calculated that, to meet the demands of the annual fair of Obdorsk alone, there are sent northwards every year, by private adventurers and merchants, about 16,000 poods of flour, and 4000 poods of bread ready made, besides 9000 poods of flour sent on account of the crown. Respecting the details of the business done at that important fair we received more copious information in Obdorsk, but the opulence of the merchants here is the consequence of that trade; and, indeed, their ware-rooms were

* The condition assigned for the cultivation of barley, by observations made in Europe, is that the mean temperature of any of the three summer months shall not fall below 7° R. But the warm summers of Beresov go considerably beyond this limit, for there the mean temperature of

June is + 14°·8 R.
July + 13°·4
August + 15°·8.

It must be here remarked, that the annual mean temperatures of the air for Beresov and Tobolsk agree, but that each of them is about 3°·8 R. lower than the result obtained by boring.

stored with all the most precious products of Ostyak and Samoyed activity. The larger portion of their stock consisted of reindeer skins, which, being much valued for clothing, are sent from this place to all the towns in the government. They are divided in the warehouses into many different classes, according to the age of the animal and the condition of the hair, each class or quality having its proper name.

A great number of fresh reindeer skins also were to be seen hanging up in the air to dry. These are the skins of the deer procured by the merchants, at all times of the year, from the tribes in the neighbourhood, who keep herds for venison, which they either consume themselves or sell to the Russians further south. As the inhabitants of the southern part of the government of Tobolsk derive their chief supply of cattle, not from herds of their own, but from those of the Kirgis, so in this quarter the reindeer of the Ostyaks present a similar resource. At present, indeed, and in consequence of the introduction of the Russian mode of living, the herds of deer of the most northern tracts are far from being so numerous as the flocks of the South Siberian steppes; but still this venison is here cheap enough to allow every Russian to change his ordinary fish diet for it, as often as the rules of the Greek church will allow him; for useful as the reindeer is, in a variety of ways, a full-grown one may be had from the Ostyaks at any time, for six or eight roobles. It was an unfortunate circumstance for the Ostyak and Samoyed herds, that the Russian clergy always reckoned the reindeer among the animals which are cleanest and fittest for human food; for besides possessing the organisation required for that purpose by the laws of religion, being cloven-footed and ruminant, it is also marked out especially, as I have heard them remark, as food for man, by its gentle and harmless disposition. It would have made

a great difference with the resources of the country, if the deer had been the object of the decided aversion which the Greek church entertains for the hare. In Beresov there seemed to be abundance of reindeer venison at every table. It was dressed in a variety of ways; and, in the favourite cabbage-soup, it took place, lean as it was, of beef or mutton. The tongues of Ostyak cattle, also, were laid by here in large quantities, partly frozen in the fresh state, and partly dried in the smoke of the yurts.

Among the fur animals which give life to the trade of this place, the polar or stone-fox (in Russian, pesètz; *Canis lagopus*, *isatis*), deserves the first mention, on account of its extraordinary frequency. And of these, the promúishleniks and merchants of Beresov distinguish seven varieties, depending on the age and development of the animal; one of them is the pesètz, properly so called, with perfectly white, long, and bushy hair. The name of this variety, and, indeed, of the whole species, is the diminutive of *pes*, which in old Sclavonian denotes the common house dog.* Two other varieties, known to the fur traders by the names of nórniki and kopántsí, are unquestionably referable only to the age of the individual. The first of these names denotes the young stone-foxes which have quitted, indeed, the parental home or burrow (*nóra*), but still linger in its neighbourhood; while the name of kopànetz (from *kopàti*, to dig), is applied exclusively to the stone-foxes which are dug from the burrow. Both these varieties are mouse-coloured.

There is a fourth kind, called nédopeski, or nedoshlie pestzi, which means the incomplete or imperfect stone-foxes: it is distinguished from the pesètz,

* The Russians at present use only the words *sobáka* and (in the feminine) *suka*, in speaking of the domestic dog; the word *pes* (in the plural *psi*) belongs to, the sportsman's vocabulary, and is applied by astronomers and mariners also to the constellation *Canis*.

properly so called, only by having shorter and perfectly white hair, peculiarities which depend much more on the periodical changes which take place in the covering of these animals, than on their growth and development. Yet it is not certain whether the very distinct and, by the Russians, highly prized variety of the krestovátiki or crossed stone-fox, has its origin in a periodical or progressive change of the hair, though I deem the latter the more probable supposition. In this variety the hair is shorter than in the fully developed or regular pesètz; its colour is partly mouse-yellow, partly white, and so distributed that the greyish parts unite prettily to form a cross, one bar of which extends along the back, while the other stretches obliquely down the middle ribs to the belly. Skins of this kind I saw in great numbers in Beresov. They measured ten inches from the root of the tail to the point corresponding to the first joint of the neck; so that the animal seems to be rather less than the full-grown pesètz, the length of which is eighteen inches. The hunters here are all persuaded that the much valued krestovátik is nothing more than an undeveloped stone-fox. On the other hand, I have no doubt that what is called the North American *Canis decussatus*, of which Geoffroi has made a separate species, but which others hold to be but a variety of the common fox (*Canis vulpes*), which is, however, always much larger, is in reality a variety depending on a regular change of colour exactly similar to what is here observable in the *isatis*.*

The fur of the krestovátiki is particularly esteemed by the Russian clergy, as pelisses may be made of it which are covered with crosses. There is another

* Pallas, too (Fauna Rossica, i. p. 47), assumes (certainly not on the evidence of his own senses), that the krestovátik belongs to the *Canis vulpes*; but the northern habitation, the size, and the total absence of red hair, refute this opinion.

much rarer kind of fox found here, called *goluboi* or dove-coloured, which is also thought to be a stone-fox; and, indeed, its size and general character favour this supposition. Yet the hunters hold, that a fox which is once blue or dove-coloured is always so, and at all seasons; an opinion rendered questionable by the description of the seventh and last variety—the sínevatik, the back of which is of a deep bluish grey, while the rest of the body is white.

Still more important for the fur traders of Beresov, is the great frequency of the common fox (lisítzi), the fur of which varies extremely in price, according to the many-fold distinctions of colour. As blue, grey, and white, create the varieties in the case of the pesètz; so black, bright red, and white variously distinguish the foxes, and give them very different values. The perfectly black furs bear the highest price, which sometimes amounts to five times the yasak, or fifty roobles, particularly when the hairs are tipped with white. Furs of a uniform brownish black are more common; and, after them come the red furs, differing in price, however, according as the throat is marked with a spot of black, white, or grey. The skin of the fox is much lighter and thinner along the breast and belly than on the back; and, consequently, fashion has now decided, in the towns of Western Siberia, that fox-pelisses for women should be made only of the under part of the skins, while the backs are joined together to clothe the men.

Respecting some other animals of the extreme north, I subsequently obtained more accurate information at Obdorsk; but the mention of the beaver (*Castor fiber*) belongs to this place, because it is exactly in the latitude of Beresov that this animal is found in the greatest abundance, in some streams running into the Obi, and it is brought to the merchants here by the Ostyaks, as well as by the Russian

promúishleniks. I saw these handsome and shining furs lying here in heaps; but the people said, and justly, that they were far inferior to what are here called the Kamchatkian beaver, for this is the name given in Western Siberia to the skin of the sea-otter (*Lutra marina*), or, as it is called in Eastern Siberia, sea-beaver; which is indeed far more valuable than the beaver of the Obi, or than any other furs of Northern Asia. It is not the fur, however, which the beaver hunters have in view, but the precious castoreum, or beaver-stone, to which unparalleled medical virtues are ascribed. It is well known that the attempts hitherto made in Germany, to obtain from the beavers of the latter country a product which may be substituted for that of the north, have all proved fruitless, for the German castoreum bears no comparison with that of Siberia; but of the Siberian again, that which is collected on the Obi is particularly excellent, and a pound of it was sold last year, by M. Nijegoródsov to a merchant of Irbit, for 500 roobles.

I took care to make inquiries respecting the process used in preparing the beaver-stone, and found it so extremely simple that I could not help concluding that the excellence of this article depends entirely on the animal producing it; which is more perfect developed in the high north, where nature scatte animal perfumes in place of fragrant flowers, than in lower latitudes. In fact, the preparation of the castoreum consists in nothing more than in dipping the bags, the moment they are cut off, when they are about three inches long, and one and a half broad, into warm milk, after which they are dried slowly. Neither the oven nor the sun's rays are resorted to in order to expedite this part of the process; but the bags are hung up in a shady place, where they may dry by the current of fresh air alone. There is

hardly any drug which recommends itself to man so powerfully by its impression on the external senses as this. The Ostyaks were acquainted with its virtues from the earliest times; and it was related here that they keep a supply of it in every yurt, that the women may recover their strength more quickly after childbirth. In like manner the Kosaks and Russian traders have exalted the beaver-stone into a panacea; for these people, though, in cases of danger, they habitually look for safety to religious confidence, are yet inclined to reckon strength of constitution, and whatever is thought calculated to promote it, as further grounds of hope. To the sentence, "God arose, and our enemies were scattered," the Siberians add, very characteristically, the apocryphal interpolation, "and we are free from head-ache." To ensure this most desirable condition, every one has recourse, at home or on his travels, and with the firmest faith, to two medicines, and only two, viz., beaver-stone, or beaver-efflux as it is here called, and sal-ammoniac.

It is not surprising that men should yield to the instinctive tendency to generalise, and, from the strength of the castoreum, should infer the wonderful virtues of the whole animal, and of all its parts. I [redacted] here, at M. Nijegorodsov's, some roundish lumps of fat, which were likewise extracted from the beaver of the Obi, resembling the castoreum bags in size, shape, and colour, but without any smell. They were here called *póchki*, or kidneys, and it was stated that they lie on the breast of the females, immediately under the skin. The yellow fat which forms the mass of these round bodies, is covered with a brown skin, through which it sometimes exudes. The póchki are not exported, but the Siberians collect them eagerly, because, as they say, gouty swellings disappear rapidly when rubbed with this fat. Another offspring

of the sympathetic theory, is the belief that the teeth of the beaver cure the toothache.

One of the interesting remarks made by the people of Beresov, with respect to the beaver, was, that it alone, of all the fur animals, undergoes no change of colour in the course of the season. The winter passes over without making any impression upon an animal which then dwells and moves wholly in the water; and it is not unlikely that the comparative comfort and equable temperature enjoyed by the beaver in this latitude, conduce to that organic development which renders its produce so valuable. There are always two passages leading from the subterranean dwellings of the beavers of the Obi; the one opens on the steep bank of the stream above the level of the water; the other, so deep under the water as not to be closed in winter by the ice, the usual thickness of which is here about four feet eight inches. All the stories which have been repeated for centuries in European books of natural history, respecting the constructive talents of the beaver—the dams which they build — the bars of wood which they cut and shape to their purpose — are all related by the hunters of Beresov in terms so perfectly similar, that it can hardly be doubted that we are here at the first sources of the information.

Two assertions, however, made respecting the beavers, were new to me. One was, that among beavers, as with bees and men, there are distinctions of ranks; each chief keeping a number of labourers, the toils of which he oversees and directs, without taking part in them; and again, it was stated, that the contents of the castoreum bags depend on the moon. In regard to the first of these points, my information was unfortunately derived only from Russians, and not from Ostyaks, who are unacquainted with any condition of men exempt from labour; and I am, therefore, un-

able to decide whether the assertion might not have originated in the desire to trace an analogy between the beaver and the human species, or whether it was actually founded on some indulgence allowed among beavers to females, perhaps, and to the young. With respect to the influence of the moon, it is evident that we have nothing to do in this case with varying gravitation, as in the phenomena of the tides, but simply with the changes of light, as is manifest on a close examination of the statements made, for the two syzygies are said to have opposite effects, so that both Ostyak and Russian hunters maintain that the bags are good for nothing at new moon, whereas they afford a rich prize only at full moon. But there is reason for suspecting that in the long winter's nights the advantages of moonlight are enjoyed by the hunter without being felt by the animal.

Although I had had previously many opportunities of becoming acquainted with the strikingly singular habits of the Russian merchant, yet I had nowhere seen them developed in such vigour and purity as here in Beresov. In the houses a seat is offered to strangers under the obrasa (see p. 108.), which is adorned with votive tapers in great profusion, and with other suitable decorations collected during travels in the south. The chief apartment is in other respects comfortless and empty; but from the adjoining rooms are brought wine, which is offered by way of welcome, and various dainties, the produce of distant regions; after these are introduced curiosities and rare objects of every description, to which the bearded owner appeals in confirmation of his stories, or with which he tries to tempt his visitor to barter. The magazines and storehouses are filled exclusively with reindeer skins, and such other merchandise as must be kept in large quantities; but the merchant, at home as well as on his journeys, keeps all his more precious goods immediately about him, and in his

house one sees, heaped promiscuously, as if thrown together by accident, the skins of wild animals of all kinds, arms for Russians and for Ostyaks, packages of tea and mammoths' bones, Russian clothing, Samavars, brandy and madeira, beaver bags and needles, Bokharian fruits, Samoyed furs, tobacco, and other luxuries. One of these rooms would, in Europe, be taken at first view for the closet of some cynical antiquarian, or perhaps rather for the abode of an itinerant showman; for to the disorderly chaos of odds and ends, picked up in the course of travel, the merchant's wife and daughters add their clothes and the whole household stock, reserving the back rooms for their own accommodation exclusively. The Russian traders, taking a lesson from the Tatars, try to habituate their wives to a life of seclusion, like that of the convent, in order that, in the absence of their lords, they may shun, through shyness, the eyes of strangers. Here, as elsewhere, the execution may fall short of the strict letter of the law; but where this is not the case, the women find consolation for their loneliness in the treasures accumulated around them, which they are at liberty to consider as their own property, until such time as a purchaser presents himself, or a new expedition is undertaken. The language which Homer applied to the Sidonians of his day, still holds literally true with respect to the traders of Beresov; for in the course of their winter's journeys along the shores of the Icy Sea, they, too, "encounter many dangers, and they bring back as gain a thousand precious things, wheedling and over-reaching the simple-minded people with flattering, wily words." (Odyss. II. 237., IX. 255., XIV. 288., XV. 115.).

But there are also men here belonging to the races of central Asia, who still retain some hold on the monopoly which they possessed under the successors

of Chingis Khan, for many of the necessaries required by the Russians of Beresov are brought to this place from the country round Tobolsk, 1000 versts distant, by Tatars, at all times of the year. A traveller of this description was lodged in the same house with me in the town. He led a temperate and simple life, according to the precepts of the Korán, but this evening I found him, clad as usual, in a light-coloured khalat, and sitting cross-legged on the floor, playing cleverly on a balalaika or Russian guitar, and singing some Tatar verses, which were, he told me, a lament for the fall of Kasan.

Of the feathered game, from which the people of Tobolsk derive such luxurious supplies for their tables, there is also an abundance here. At this season the birds shot were chiefly the cock-of-the-woods, or, as the Russians call it, the pigeon-grouse, and the bird called the kuropátki. The heath-fowl shown to me under the latter name were now perfectly white, with the exception of some black tail feathers. They have but three toes, and no spurs. Not only are the feet covered with feathers down to the division of the toes, but tufts of feathers reach even to the claws, which are incurvate, and hollow underneath. The bill is strong and black, the upper part being boldly arched, and terminating in a point, which is bent down so as to overlie the under part.

In summer time the immense multitudes of wild ducks found here, help to replenish in an agreeable manner the provision stores of the Russians. They are caught in the way already mentioned (p. 334.), and their eggs, too, are collected. Within these few years, some of the people in the town possess domestic poultry also, which they keep during the winter in coops adjoining the bath-rooms, and warmed twice a week.

December 3. — The magnetic observations were

complete, and to-day the necessary preparations were made for continuing the journey down the river. It is important to consider a distinction made by the Russians in speaking of the native tribes of the adjacent tracts, for the denominations Verkhovie and Nisovie Ostyaki were used here as if they were the proper names,—the former, of the people with whom we had hitherto had intercourse, and the latter, of those to whom we were now directing our steps. The expressions in question, however, have reference only to the *upper* and *lower* tracts on a river, and the line of demarcation which they seem to establish is, in reality, quite arbitrary; yet when taken in an ethnographical sense, they are not misplaced at Beresov. How far the distinction referred to between the native tribes may have originated in the last century, on account of the increased traffic of the Russians on the Obi, I was better able to judge on my return from the country down the river, for I then perceived that there is a wide difference between the dialects of the Verkhovian Ostyaki of Samárovo, and the Nisovian Ostyaks of Obdorsk, which gradually disappears towards Beresov, at which place there is no perceptible difference in respect to language between the natives immediately above and those below the town; but here, nevertheless, is the line of separation with respect to the clothing of the people, which in these regions must be looked on as the first element of comfort and well-being, the grand object of domestic economy and social union. It is north of Beresov that we first find in general use that clothing of reindeer skins, which reaches Tobolsk as an article of trade, and which we, having procured it there, found most eminently serviceable throughout our journey. Among the Verkhovian Ostyaks nettle-bast or fish-skins are substituted for the skins of the reindeer, but in the shape of their garments they

adhere to the pattern given them by their northern neighbours.

The Ostyaks as well as the Russians in this country call the skins of very young rein-deer fawns, peshki, while, under the name of neplúi or neplúiki, they comprise the skins of all the older deer which are not yet full grown. These two classes of peltry are used for most parts of the Nisovian clothing, and it is only for especial purposes, to be mentioned hereafter, that recourse is had to the much stronger hide of the full grown animal. The five essential articles of dress are, for men and women, perfectly alike, and the sixth or over-all is used in like manner by both when the cold is intense. The hood which hides the face is consequently the only external distinction of the sexes among the Ostyaks.

They first pull on short drawers made of curried reindeer skin: these fit tight round the hips, and reach down to the knee. They then draw on stockings, of extremely flexible and soft peshki, with the hair turned next to the wearer's skin, and trimmed carefully, so as to lie perfectly even: they reach a few inches above the knee, and are there tied with thin leathern thongs. Then come the boots (in Ostyak, púimi) of equal length, and made of the strong leather of old reindeer. In these the hair is turned outwards, on the leg as well as on the sole, and in the latter situation it is invariably placed so as to point forwards or towards the toe, in order to increase the resistance from friction in case of descending a slope on smooth ice or hard snow. The lower part of the boot is very wide and roomy, but the leg fits tight, and is made of two pieces, of which the wider wraps the limb from behind till it joins the narrower, which lies flat upon the shin: particular care is taken to fasten perfectly the covering of the feet. For this purpose are used in the first place

two thin straps, which reach from the leg of the boot to the girdle. But besides these, there are two strings sewed to the boot behind, just above the calf of the leg, which are tied together in front. In no case did I see leathern thongs employed for this purpose, but every where the same sort of red woollen strings, which the Ostyaks buy of the Russians. The reason for the preference thus given to the European article is obvious, for in intense frost leathern thongs stiffen, and cannot be tied so well as soft strings. Now on the close fitting and tying of the Nisovian boots depends their warmth as well as convenience.

We have so far described only the covering of the Ostyak's lower limbs. Above, the first garment drawn on and worn next the skin, is the *málitza*, which bears a general resemblance not only to all the other upper clothing of the Ostyaks, but to that also of most of the nations of northern Siberia; and, indeed, the French *blouse* and the Sicilian *marinajo*, furnish, in respect of popular costume, a remarkable point of comparison between the inhabitants of southern Europe and of northern Asia. The málitza is generally made of neplúi or skins of young deer, sewed together, closed all round like a sack, with sleeves, and an opening to put the head through. The soft hair is turned in towards the skin of the wearer, excepting as far as regards the receptacles of the hands, or the gloves attached to the sleeves, in which the hair is always turned outwards. It appears at first sight extraordinary too, that these hand coverings attached to the málitza are invariably made of the hardest and most inflexible portions of the reindeer hide,—of the extremity of the leg of the full grown animal. But as in reindeer travelling, in fishing, and in the chase, the Ostyaks are often obliged to put their hands to rough and heavy work, they prefer a thick and strong covering for the extremities to one which

is delicate and flexible. To allow the complete use of the fingers at fine work, there is a transverse slit at the under side of the glove, through which they may be thrust so as to move at liberty without being altogether beyond protection.

Over the málitza is drawn a second garment, the *park*, which ordinarily completes the dress. But when the Ostyak reckons on long exposure to the air, he wears instead of the last-named outward covering, that which is called the *gús*, while travellers again wear the park over the málitza, and the gús over both these, as a last protection. Both park and gús are shaped like the málitza, but the two first-named have this essential character, that they have the hairy side turned out; so that either of them in conjunction with the málitza forms a clothing covered with hair on both sides, an advantage which man by his ingenuity thus obtains above other animals. The málitza may be lengthened so as to cover the hands, while each of the other two garments supplies a covering for the head; for attached to them at the neck, is a close-fitting hood, which completely protects the wearer's head and neck, leaving in front an oval opening large enough to allow the projection of his temples, cheek-bones, and chin. The park is always made of neplúis sewed together, and bears, for special ornament, on the top of the attached hood, the pointed ears of the young animal: its edge is always handsomely trimmed with the skin of the young, long-haired dog, which, as we observed at Kunduvansk, is reared and fondled by the women, to be afterwards sacrificed to the love of ornament.*

The overall, called gús, is invariably made of the

* Since I have discovered (as will be shown further on) a connection between the Ostyak and Hungarian languages, it appears to me that the Ostyak name of this garment has reference to its peculiar trimming, and that it corresponds with the Majar word *parkany*, an edge or border.

long-haired skin of an old rein-deer in its winter coat. It gives the Ostyak men the look of fine polar bears; for, though the Kosaks of Beresov prefer this article of dress when it is of a brown colour, the Ostyaks are decidedly in favour of a snow-white gús; whether it be that, having their attention fixed by the annual change of colour in wild animals, they have learned to recognise in white surfaces the property of radiating heat slowly, or else that they find it advantageous in hunting to be as undistinguishable as possible from the snow in colour, so as not to attract the notice of the animals pursued. And here it may be remarked, that among tame rein-deer the change of colour follows no certain rule; for I have seen in the middle of winter, along with a number of snow-white animals, as many more exhibiting every shade of colour to a perfect brown; and this difference is not attributable to age, for among the collected peshki and neplúiki (see p. 486.), there is always plenty of choice between white and brown. As a remarkable distinction between the park and gús, I have still to mention that the latter is much the lighter of the two, which proves manifestly that the hide of the old animal, covered with hair, is specifically lighter than that of the younger and imperfectly grown animal; and it might, perhaps, be worth inquiring, whether a similar result of age might not be found among other and kindred ruminants.

After the body has been protected from cold in the way here described, there still remains something to complete the dress. The upper garments, which reach little beyond the knee, are not at all in the way, nor do they impede the wearer; indeed, owing to the equal distribution of the weight over the whole body, the whole three may be worn at the same time, without either oppressing or hindering motion. Yet the Ostyak men are accustomed to bind themselves

tight round the loins with a strap about an inch wide (in Russian, *kushàk*); and by this means they contrive to raise the málitza a little, to gather it on the breast and back, while they make a fold in the garment next the body, which serves as their only pocket. This, however, is only capable of receiving small articles; for whatever is to be pocketed must first make its way through the transverse slit in the left glove, and then, the right hand holding up the left sleeve, the left arm draws back and seeks the pocket. We shall afterwards have to mention these pockets as the receptacles of the snuff, of which the Nisovian Ostyaks are passionately fond.

It is a striking fact, and one worthy of attention, that no Ostyak ever wears the strap round the loins without decorating it with some metal pieces; for it is this portion of their dress, not taken from the reindeer, which renders the people, to some extent, dependent on strangers. At present they satisfy this want through the Russians, and at high prices. They buy for fastening the girdle a brass plate with three eyes, which are tied to one end of it, and a brass hook for the other end of the belt, besides a number of metal studs, with which the kushàk is ornamented. In truth, the kind of buckle here described enables them to tighten or loosen the belt, exactly according to the measure of the meal which they have taken, so as not to lose the advantage of a pocket. Still, if the decided preference of this expedient were not the result of ancient custom, they could not fail to perceive that a tied girdle is as convenient as a buckled one, and much less expensive. The price of those metal articles is considerable on this very account,—that they are bespoken in Russia by the Siberian merchants solely for the use of the Ostyaks; for the Russians themselves, both in Europe and Asia, make use only of woven sashes for such purposes. These

circumstances seem to indicate plainly, that long ago, and before the Russians had changed the aspect of affairs in Siberia, a people acquainted with the working of metals maintained an intimate commerce with the Nisovian Ostyaks.

A knife with a broad iron blade and rude wooden handle, in a leathern sheath, always hangs at the girdle. This indispensable instrument is called by the Ostyaks Kăje and Kăsim, and they buy it from the Russian traders as eagerly as their other metal articles*; yet its general introduction does not pronounce so decidedly as that of the above-mentioned ornaments and objects of luxury, in favour of an early intercourse with a people possessing metals; for, even supposing that the Ostyaks, previous to their acquaintance with the Russians, had used knives of stone or other substitutes for iron; yet in this case the innovation was of such visible and overpowering importance, that its speedy and exclusive adoption cannot be compared with that of unessential fashions, nor require, as in the case of the latter, a particular elucidation.

Although these explanations with respect to the dress of the Nisovian Ostyaks were important to us in Beresov, as preparatory to our intercourse with that people, yet the attempt to describe or inquire into all the peculiarities of the nation, in connection with intellect and manners, before visiting their northern abodes, would be premature, since the collective results of an acquaintance with the Verkhovian and Nisovian tribes ought to be weighed impartially in order to distinguish what is truly national, in usage and opinion, from what is adventitious and accidental. Yet some of the results furnished by our

* In Hungarian a knife is *kés*, a hand *ketz*. In the Vogul dialect of the Ostyak language the word *kat*, a hand, is still retained.

conversations in Beresov may be here mentioned for their individual value. The honesty of the Ostyaks is both praised and wondered at by the Russians. Theft is never heard of, and if a trader who spends a night in a yurt, should miss any of his bread, he must keep his eye on the dogs, who are sure to be the guilty parties. An engagement made by one of the aboriginal inhabitants of this country is never broken, provided it be confirmed with certain usual formalities. A member of the court of justice told me, that in suits between Russians and Ostyaks, it is still the custom here to bring into court the head of a bear, and that this animal, which is supposed to be omniscient, is there appealed to as a witness by the Ostyaks. In swearing they make the gesture of eating, and call upon the bear to devour them in like manner if they do not tell the truth.

It was also said that a promise made operates even after the death of him who made it, the son voluntarily paying his father's debts; and that frequently families have discharged the engagements of deceased members after several generations, on the production of incontestable proofs. Among these may be reckoned certain notches cut in wood, which, without having the value of written characters, are adopted by, and descend in some families, as ciphers, representing names. It has happened, that marks of this kind found on the woodwork of a yurt, were deemed sufficient proof of the building having been pledged for debt, and that the claimant, relying on this evidence alone, obtained possession.

Knots on a cord, or on a thong of leather, serve to mark numbers, and conventionally things also. Thongs of this sort I had seen, without knowing their meaning, in some of the yurts immediately before Beresov; and here I learned that, in conformity with old habits, they are used by the Ostyaks to keep

an account of the horses furnished to Russian travellers, and for which payment is to be afterwards received in the town. We know from Marco Polo's narrative, that already, in the thirteenth century, there was a posting system established, for the convenience of travellers, throughout all the countries ruled by the descendants of Chingis Khan; nay, more, we find the same formality of an imperial podorojna or passport, in use then as at present; and, as the Venetian travellers proved by experience the sufficiency of their post-order between Pekin and the Black Sea, so it is clear enough from various passages of their journal, that, at that time, the inhabitants of the Obi also would have supplied them with the means of travelling, if required so to do. Yet, from the Verkhovian Ostyaks they could have got only dogs, for the use of horses belongs to a comparatively late period of this people's history. Of this fact we were often reminded in the course of our journey hither by the extreme awkwardness of our good-humoured drivers; and here, in Beresov, they tell a story of a Verkhovian Ostyak who lifted a horse's hind-leg, and tried to put the collar on the animal's loins, as if he were yoking a dog.

Finally, it must not be left untold how often, in the midst of the antique and Asiatic mode of life characterising Beresov, the attention is called to the events of modern Europe by strange and startling contrasts. We had already heard people in Siberia alluding, under the name of the unfortunates of the 14th December, to the revolutionists whom a judicial sentence, following the last tumults, had dispersed over Northern Asia; and of these we met here, in Beresov, M. Górski, at one time a Count and general of cavalry, (but his rank and title had now ceased), and the ex-chieftains Focht and Chernílov. They were generally to be seen in Nisovian clothing; but

on holydays they wore European coats, in order to display the vestiges of orders which had once been sewed upon them.

In this case men of very different stamp had clung to the same plank in the common shipwreck. The two younger alone felt broken-spirited; for they had blindly resigned themselves to one thought, and were so possessed with that spirit of agitation which, issuing from Germany, has become traditional in Russian conspiracies, that the poor men still thought that all Europe sympathised with them in their downfall. But the older and hardier warrior had been intoxicated merely by a fool-hardy passion for desperate struggles. Partly unknown to, partly despised by, the conspirators, he joined their ranks for the first time on the decisive day; and now he felt as one who had been subdued only by force of arms: besides, he liked Beresov well enough, and only complained of the impediments which the climate presented to equestrian life. The horses of this place were scarcely able to carry him; and though, for his amusement, he had taught the Kosaks of Beresov all the rules of the riding-school, yet the deep snow and the swampy ground prevented exercise on horseback in winter and in summer. Some other victims of that fatal month had buried themselves in complete solitude in Beresov: it was said that they were living with their wives, who had followed them into Siberia. Such examples of connubial fidelity are far from being unusual in the history of Siberian exile.

Among the various tales circulated in Western Europe respecting Siberia, may be reckoned the statement, that the exiles of this or some other description are obliged to hunt the sable or other fur animals. But, in truth, it is only in the Uralian mines and those of Nerchinsk, and in certain manufactories, that persons condemned to forced labour are ever seen,

and several of the rioters whom we saw here in Beresov had already served a year of punishment in Nerchinsk.* All the rest, and the great majority of the Russian delinquents, are condemned only to settle abroad; and, if they belong to the labouring classes, to support themselves; yet with this consolation, that, instead of being serfs as heretofore, they become in all respects as free as the peasants of Western Europe. Political offenders, however, who belong, in Russia as elsewhere, generally to the upper classes, or those not used to manual labour, are allowed to settle only in the towns of Siberia, because the support allowed them by the government can thus reach them more easily.

I have often heard Russians who were intelligent and reflecting men, mention as a paradox which hardly admits of an explanation, that the peasants condemned to become settlers, all without exception, and in a very short time, change their habits, and lead an exemplary life; yet it is certain that the sense of the benefit conferred on them by the gift of personal freedom is the sole cause of this conversion. Banishment subservient to colonisation, instead of close imprisonment, is, indeed, an excellent feature in the Russian code; and though the substitution of forced labour in mines for the punishment of death may be traced back to Grecian examples, yet the improving of the offender's condition by bestowing on him personal freedom, is an original as well as an admirable addition of a Russian legislator.

* Exiles of this kind are called in Siberia, *katorshuiki*, their punishment *katorshuiki rabóta* or *katorga*. No one there ever thinks of the derivation of this word, which is corrupted from κάτεργον, the name given to a galley by the Byzantine historians as well as by the Greeks on the Black Sea at the present day.

END OF THE FIRST VOLUME.

LONDON:
SPOTTISWOODE and SHAW,
New-street-Square.

00088340

Digitized with financial assistance from the
Government of Maharashtra
on 09 March, 2016